United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with West Virginia Agricultural and Forestry Experiment Station

Soil Survey of Doddridge County, West Virginia

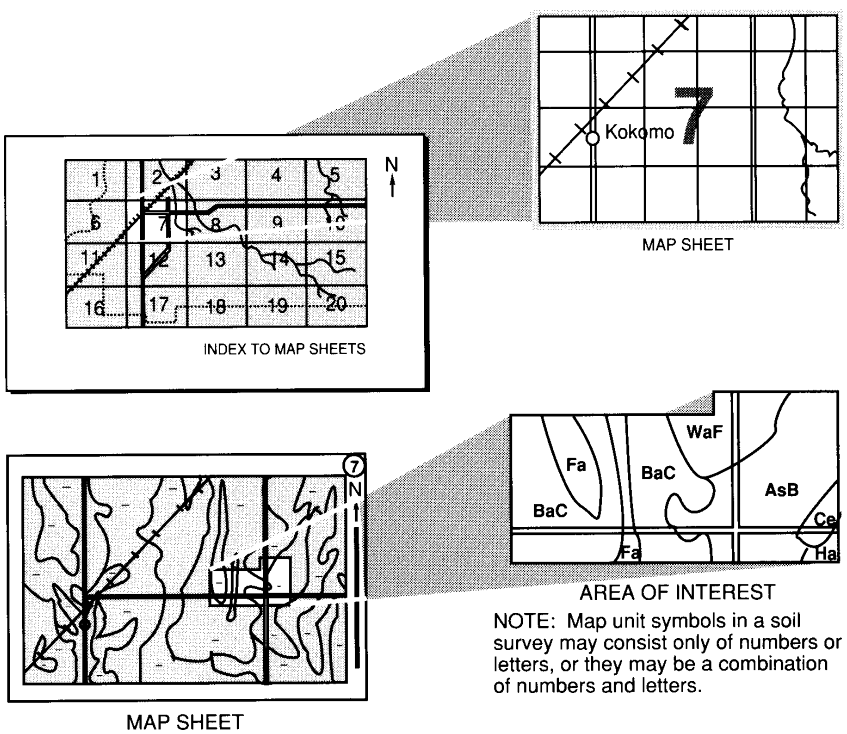
How To Use This Soil Survey

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and go to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Go to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2000. Soil names and descriptions were approved in 2001. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2000. This survey was made cooperatively by the Natural Resources Conservation Service and the West Virginia Agricultural and Forestry Experiment Station. The survey is part of the technical assistance furnished to the West Fork Soil Conservation District.

Cover: A typical landscape in Doddridge County. Kanawha and Chagrin soils are in the foreground, and Gilpin and Peabody soils are in the background.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

Contents

Issued September 2005

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Ronald L. Hilliard
State Conservationist
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Soil Survey of
Doddridge County, West Virginia

By Scott L. Hoover, Natural Resources Conservation Service

Fieldwork by Scott L. Hoover and Carlos P. Cole, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
West Virginia Agricultural and Forestry Experiment Station

DODDRIDGE COUNTY is in the north-central part of West Virginia (fig. 1). It has a total area of 205,200 acres, or approximately 321 square miles.

In 1995, it had a population of 7,238. West Union is the county seat and the largest town in the county. It is along Middle Island Creek and is the only incorporated town in Doddridge County. Many small unincorporated communities are scattered throughout the survey area. The main economic enterprises in the survey area are timber production, farming, natural gas and oil production, and recreation.

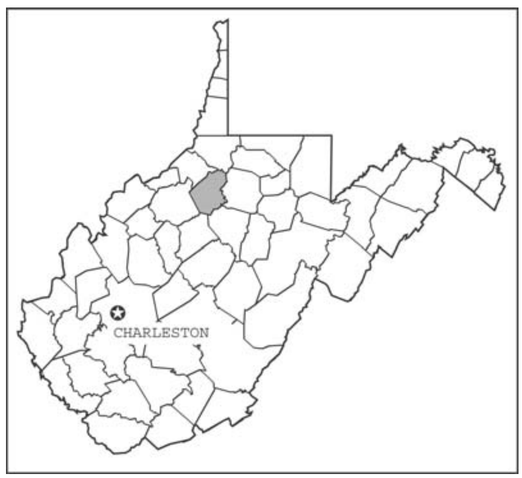

Figure 1.—Location of Doddridge County in West Virginia.

This soil survey updates an earlier survey of the Clarksburg area in West Virginia (Mooney and Latimer 1912). A portion of Doddridge County was also mapped by the Natural Resources Conservation Service (then known as the Soil Conservation Service) in the 1940s. This survey provides additional information about the soils of this county and more accurate soil maps.

General Nature of the County

This section provides general information about the county. It describes settlement; farming; transportation facilities; relief and drainage; geology; and climate.

Settlement

The first permanent European settlers in Doddridge County were immigrants from Maryland and Virginia. They came to this county in about 1773. Settlement was slow until minerals were discovered in the area.

On February 4, 1845, a legislative act formed Doddridge County from parts of Harrison, Tyler, Ritchie, and Lewis Counties. The county was named in honor of Philip Doddridge, who was a distinguished lawyer from Brooke County, Virginia, in the early part of the 19th century (Mooney and Latimer 1912). West Union was formerly called Lewisport in honor of Lewis Maxwell.

Two special West Virginians have called Doddridge County their home. Joseph H. Diss DeBar, an artist, designed the West Virginia State Seal and Coat of Arms and was author of the first "Handbook of West Virginia." Matthew M. Neely was the 21st governor of West Virginia and was elected to five terms in the U.S. House of Representatives and Senate.

Farming

In 1987, the county had 270 farms, which averaged 212 acres in size. By 1992, the number of farms had decreased to 261; however, the average size of the farms had increased to 227 acres. About 59,184 acres was used as farmland in 1992.

The main types of farming are raising beef cattle, mostly cow-calf operations, and producing hay and pasture. Much of the farming is done on a part-time basis by individuals who also have jobs off the farm (U.S. Department of Commerce 1994).

Transportation Facilities

Doddridge County is served by a network of highways, including U.S. Route 50, West Virginia Routes 18 and 23, and numerous county roads. At present, no railroads are operating in the survey area.

Relief and Drainage

Doddridge County is in the Central Appalachian Plateau physiographic province. It is on a highly dissected plateau. Most areas are characterized by narrow ridgetops and deep, V-shaped, narrow valleys that have steep or very steep hillsides. The hillsides are commonly separated by long, narrow, less sloping benches. Most of the flood plains along the smaller streams are narrow. The largest flood plains and terraces are along Middle Island Creek and McElroy Creek. The county is drained primarily by Middle Island Creek and McElroy Creek. The Hughes River and the Little Kanawha River drain smaller areas of the county.

Elevation ranges from 746 feet above sea level on the Tyler County line on McElroy Creek to 1,557 feet above sea level on a knob in the Five Points area near the Harrison County line, a variation of 811 feet.

Geology

Jeff McClure, state geologist, Natural Resources Conservation Service, helped to write this section.

The rock strata in Doddridge County have a few gentle synclines and anticlines, but they mainly lie horizontally. All surface rocks in this county are sedimentary in origin and consist of sandstone, siltstone, shale, limestone, and coal of the Dunkard and Monongahela Groups of Pennsylvanian age (Hennen and White 1912).

The Dunkard Group covers the majority of the county (fig. 2). The Monongahela Group is on the lower slopes, covering an area from Summers to Grove and extending northeast, almost to the headwaters of Rock Run and Morgans Run. This area of exposure of the Monongahela Group is directly related to the crest of the Arches Fork Anticline. The dominant rock types are red and olive yellow shale; acid, gray and brown siltstone; and sandstone. Thin layers of coal and limestone outcrop throughout the county.

Figure 2.—The Dunkard Group is the dominant geology of Doddridge County. It consists mainly of alternating layers of sandstone, siltstone, and shale.

Climate

Winters are cold and snowy in Doddridge County, with intermittent thaws precluding a long-lasting snow cover. Summers are very warm, with occasional very hot days when the humidity is very high. Rainfall is evenly distributed throughout the year. The normal annual precipitation is adequate for all of the crops commonly grown in the county.

Table 1 gives data on temperature and precipitation for the survey area as recorded at West Union in the period 1961–90. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 31 degrees F and the average daily minimum temperature is 19.8 degrees. The lowest temperature on record, which occurred on January 22, 1985, is -18 degrees. In summer, the average temperature is 70.7 degrees and the average daily maximum temperature is 82.7 degrees. The highest recorded temperature, which occurred on July 17, 1988, is 103 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 46.83 inches. Of this, 22.64 inches, or about 48 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 16.55 inches. The heaviest 1-day rainfall during the period of record was 4.38 inches on September 13, 1971. Thunderstorms occur on about 44 days each year, and most occur in July.

The average seasonal snowfall is 19.6 inches. The greatest snow depth at any one time was 24 inches recorded on January 5, 1994. On the average, 27 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year. The heaviest 1-day snowfall on record was 14 inches recorded on January 5, 1994.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 88 percent. The sun shines 45 percent of the time possible in summer and 29 percent in winter. The prevailing wind is from the northwest. Average windspeed is highest, 8.2 miles per hour, in March.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the county. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the county are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the county and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics

and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called nonlimiting components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called limiting components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The limiting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis

of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Monongahela silt loam, 8 to 15 percent slopes, is a phase of the Monongahela series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Gilpin-Peabody complex, 35 to 70 percent slopes, very stony, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Udorthents, smoothed, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Ch—Chagrin silt loam

Setting

Landscape position: Nearly level flood plains throughout the county (fig. 3)

Composition

Chagrin soil: 90 percent
Inclusions: 10 percent

Typical Profile

Surface layer:
0 to 7 inches—brown silt loam

Subsoil:
7 to 42 inches—brown loam

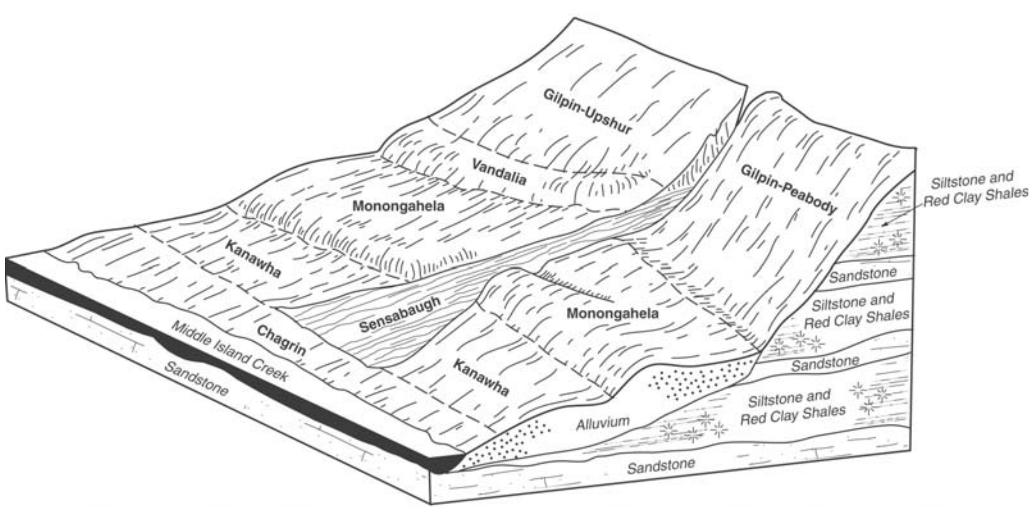

Figure 3.—Chagrin soil along Middle Island Creek. Also shown is the typical pattern of other soils and their underlying parent material in parts of Doddridge County.

Substratum:
42 to 50 inches—brown loam
50 to 65 or more inches—mixed brown, strong brown, and grayish brown stratified channery sandy loam and loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate or moderately rapid
Available water capacity: High
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: Occasional
Shrink-swell potential: Low
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Moderately acid to neutral, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: Yes

Inclusions

Limiting inclusions:
- Small areas of poorly drained or moderately well drained soils, especially in old stream channels
- Frequently flooded soils in low areas
- Sensabaugh soils

Nonlimiting inclusions:
- Soils that have more silt throughout the profile than the Chagrin soil
- Rarely flooded soils that are commonly used for urban development

Use and Management

Most areas of this soil have been cleared and are used for hay and pasture. Some small areas are wooded.

Cropland
Suitability: Suited
Management considerations:
- The flooding, streambank erosion, and soil tilth are major management concerns.
- The flooding occasionally delays field operations or damages crops.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland

Suitability: Suited

Management considerations:

- The flooding, streambank erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- The flooding occasionally deposits debris on the grassland.
- Streambanks should be fenced. Livestock access to streams should be limited to protected crossings. Bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland

Potential productivity: Moderately high

Management considerations:

- Plant competition is a major management concern.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development

Suitability: Limited

Management considerations:

- The flooding is a severe limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets.
- Constructing local roads and streets on raised fill material and adding coarse grained base material help to prevent the road damage caused by flooding.
- A suitable alternative site should be selected.

Interpretive Group

Land capability classification: 2w

Co—Cotaco silt loam

Setting

Landscape position: Nearly level, high flood plains along the major streams

Composition

Cotaco soil: 70 percent
Inclusions: 30 percent

Typical Profile

Surface layer:
0 to 7 inches—brown silt loam

Subsurface layer:
7 to 12 inches—brown silt loam

Subsoil:
12 to 18 inches—yellowish brown silty clay loam with strong brown mottles
18 to 31 inches—pale brown silty clay loam with light gray and strong brown mottles
31 to 42 inches—pale brown silty clay loam with light gray and strong brown mottles

Substratum:
42 to 65 or more inches—strong brown silty clay loam with light gray mottles

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Moderate
Available water capacity: Moderate or high
Depth to a seasonal high water table: 1.5 to 2.5 feet
Hazard of flooding: Rare
Shrink-swell potential: Low
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Extremely acid to strongly acid, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: Yes

Inclusions

Limiting inclusions:
- Somewhat poorly drained soils
- Poorly drained Melvin soils
- Chagrin soils that are subject to occasional flooding
- The gently sloping Sensabaugh soils that are mainly on alluvial fans and are subject to rare flooding
- Small areas of soils that have slopes of more than 3 percent

Nonlimiting inclusions:
- Well drained Kanawha soils

Use and Management

Most areas of this soil have been cleared and are used for hay and pasture. Some small areas are wooded.

Cropland
Suitability: Suited
Management considerations:
- The wetness, the hazard of erosion, soil tilth, streambank erosion, and the flooding are major management concerns.
- Installing a subsurface drainage system helps to overcome the wetness if a suitable outlet is available.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.

- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely delays field operations or damages crops.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The wetness, the hazard of erosion, establishing and maintaining a mixture of grasses and legumes, overgrazing, streambank erosion, and the flooding are major management concerns.
- Restricted grazing during wet periods helps to prevent compaction and poor tilth.
- Proper stocking rates, pasture rotation, timely deferment of grazing, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.
- Streambanks should be fenced. Livestock access to streams should be limited to protected crossings. Bioengineering or installing rock riprap, or both, can also help to protect streambanks.
- The flooding rarely deposits debris on the grassland.

Woodland
Potential productivity: Very high
Management considerations:
- The wetness and plant competition are major management concerns.
- This soil is soft when wet. The use of logging equipment during wet periods will result in excessive rutting.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timely planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development
Suitability: Limited
Management considerations:
- The flooding is a limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets. The wetness is also a major management concern.
- Because of the flooding, a better suited soil should be selected as a site for dwellings with or without basements.
- Because of the wetness, an alternative system should be installed or a better suited soil should be selected as a site for septic tank absorption fields.
- Constructing local roads and streets on raised fill material and adding coarse grained base material help to prevent the road damage caused by flooding.

Interpretive Group

Land capability classification: 2w

GaC—Gallia silt loam, 8 to 15 percent slopes

Setting

Landscape position: High stream terraces along Middle Island Creek

Composition

Gallia soil: 60 percent
Inclusions: 40 percent

Typical Profile

Surface layer:
0 to 7 inches—brown silt loam

Subsurface layer:
7 to 13 inches—strong brown silt loam

Subsoil:
13 to 26 inches—strong brown clay loam
26 to 51 inches—reddish brown clay loam
51 to 65 or more inches—strong brown clay loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: None
Shrink-swell potential: Moderate
Erosion hazard: Severe
Slope class: Strongly sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Very strongly acid or strongly acid, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Rapid
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Moderately well drained Monongahela soils
- Soils that have slopes of more than 15 percent
- Gilpin and Upshur soils in areas where the alluvial cap has been removed by erosion

Nonlimiting inclusions:
- Soils that have slopes of less than 8 percent

Use and Management

This soil is used as woodland.

Cropland
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.

- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, a system of conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The hazard of erosion and plant competition are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Moderately high
Management considerations:
- The hazard of erosion and plant competition are major management concerns.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when this soil is wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soil is wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development
Suitability: Limited
Management considerations:
- The slope, the hazard of erosion, the moderate shrink-swell potential, and low strength are major management concerns.
- Land shaping and grading can help overcome the slope in areas used as building sites.

- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: 3e

GpE—Gilpin-Peabody complex, 25 to 35 percent slopes

Setting

Landscape position: On ridges, benches, and side slopes
Note: These two soils occur as areas so closely intermingled that it was impractical to map them separately (fig. 4).

Composition

Gilpin soil: 40 percent
Peabody soil: 40 percent
Inclusions: 20 percent

Typical Profile

Gilpin
Surface layer:
0 to 3 inches—brown silt loam

Subsoil:
3 to 10 inches—brownish yellow silt loam
10 to 23 inches—strong brown channery silty clay loam
23 to 33 inches—yellowish brown very channery silt loam

Bedrock:
33 inches—siltstone

Peabody
Surface layer:
0 to 1 inch—slightly decomposed leaf litter
1 to 3 inches—brown silt loam

Subsoil:
3 to 7 inches—reddish brown silty clay loam
7 to 21 inches—reddish brown clay

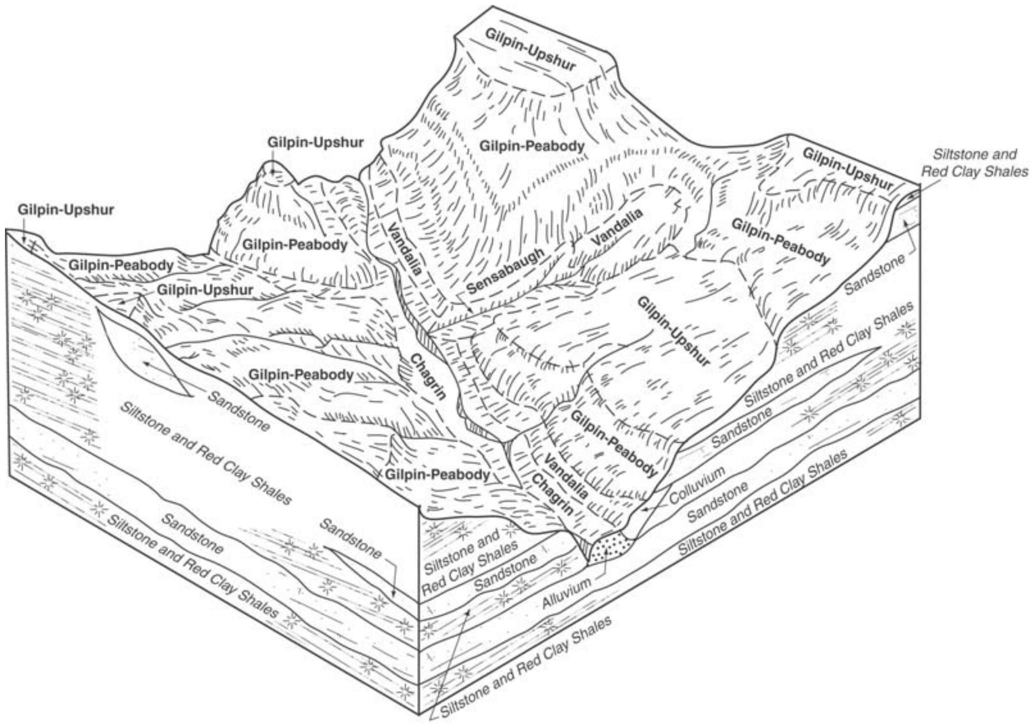

Figure 4.—A typical pattern of Gilpin, Peabody, and other soils and their underlying parent material. This pattern of soils is dominant in the county.

21 to 27 inches—reddish brown very channery silty clay

Bedrock:
27 to 33 inches—pale olive, soft mudstone
33 inches—reddish brown, hard siltstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Gilpin—moderate; Peabody—slow
Available water capacity: Gilpin—moderate or high; Peabody—low or moderate
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: None
Shrink-swell potential: Gilpin—low; Peabody—high
Erosion hazard: Very severe
Slope class: Steep
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Gilpin—very strongly acid or strongly acid, except where lime has been applied; Peabody—very strongly acid to slightly acid in the solum and strongly acid or moderately acid in the substratum, except where lime has been applied
Organic matter content in the surface layer: Low to moderate
Surface runoff: Very rapid
Depth to bedrock: 20 to 40 inches
Bedrock: Interbedded shale, mudstone, siltstone, and some sandstone
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 35 percent
- Small areas of soils that have stones at the surface
- Soils that are less than 20 inches deep over bedrock

Nonlimiting inclusions:
- Soils that have slopes of less than 25 percent
- Soils that are more than 40 inches deep over bedrock

Use and Management

These soils are used as pasture, hayland, or woodland.

Cropland
Suitability: Unsuited
Management considerations:
- Operation of most types of conventional farm machinery is difficult because of the slope.
- The hazard of erosion is a major management concern.
- A suitable alternative site should be selected.

Pasture and Hayland
Suitability: Limited
Management considerations:
- Operation of most types of conventional farm machinery is difficult because of the slope.
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Gilpin—moderately high; Peabody—moderately high on north aspects and moderate on south aspects
Management considerations:
- The major management concerns are the equipment limitation; the hazard of erosion on roads, skid trails, and log landings; plant competition; and, on south aspects, seedling mortality. Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when these soils are wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soils are wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.

- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.

Community Development
Suitability: Limited
Management considerations:
- The slope, the hazard of erosion, and the depth to bedrock are management concerns in areas of the Gilpin and Peabody soils. Additional concerns in areas of the Peabody soil are the high shrink-swell potential, the hazard of soil slippage, and the slow permeability.
- Land shaping and grading can help overcome the slope on building sites, but excavating the bedrock on sites for dwellings with basements is difficult.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Selecting areas where the soil is the deepest, oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the depth to bedrock, the slope, and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by shrinking and swelling.

Interpretive Group

Land capability classification: Gilpin—6e; Peabody—7e

GsE—Gilpin-Peabody complex, 15 to 35 percent slopes, very stony

Setting

Landscape position: On ridges, benches, and side slopes throughout the county
Note: These two soils occur as areas so closely intermingled that it was impractical to map them separately.

Composition

Gilpin soil: 50 percent
Peabody soil: 35 percent
Inclusions: 15 percent

Typical Profile

Gilpin
Surface layer:
0 to 3 inches—brown silt loam

Subsoil:
3 to 10 inches—brownish yellow silt loam
10 to 23 inches—strong brown channery silty clay loam
23 to 33 inches—yellowish brown very channery silt loam

Bedrock:
33 inches—siltstone

Peabody
Surface layer:
0 to 1 inch—slightly decomposed leaf litter
1 to 3 inches—brown silt loam

Subsoil:
3 to 7 inches—reddish brown silty clay loam
7 to 21 inches—reddish brown clay
21 to 27 inches—reddish brown very channery silty clay

Bedrock:
27 to 33 inches—pale olive, soft mudstone
33 inches—reddish brown, hard siltstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Gilpin—moderate; Peabody—slow
Available water capacity: Gilpin—moderate or high; Peabody—low or moderate
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: None
Shrink-swell potential: Gilpin—low; Peabody—high
Erosion hazard: Severe and very severe
Slope class: Moderately steep and steep
Stoniness: Very stony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Gilpin—very strongly acid or strongly acid, except where lime has been applied; Peabody—very strongly acid to slightly acid in the solum and strongly acid or moderately acid in the substratum, except where lime has been applied
Organic matter content in the surface layer: Low to moderate
Surface runoff: Rapid or very rapid
Depth to bedrock: 20 to 40 inches
Bedrock: Interbedded shale, mudstone, siltstone, and some sandstone
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 35 percent

- Soils that are on short, very steep slopes and are relatively common but in areas too small to be delineated at the scale of mapping
- Soils that are less than 20 inches deep over bedrock
- Small areas of rock outcrop
- Small areas of soils that have sandier textures and more rock fragments in the soil profile than the Gilpin and Peabody soils; on very narrow ridges

Nonlimiting inclusions:
- Soils that are more than 40 inches deep over bedrock
- Areas where the surface stones have been removed in order to make agricultural management easier
- Soils with slopes of less than 15 percent on ridges and benches

Use and Management

Most areas of this unit are wooded. Some areas have been cleared and are used for pasture, but they may contain piles of stones.

Cropland
Suitability: Unsuited
Management considerations:
- Operation of conventional farm machinery is difficult because of the slope and the surface stoniness.
- Erosion is a major management concern.
- A suitable alternative site should be selected.

Pasture and Hayland
Suitability: Unsuited to hay and difficult to manage for pasture
Management considerations:
- Operation of conventional farm machinery used in clipping and applying fertilizer is difficult because of the slope and the surface stoniness.
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Gilpin—moderately high; Peabody—moderately high on north aspects and moderate on south aspects
Management considerations:
- The major management concerns are the hazard of erosion on roads, skid trails, and log landings; plant competition; the hazard of windthrow; and, on south aspects, seedling mortality. Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when these soils are wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soils are wet causes excessive rutting.

- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.
- Because the depth to bedrock restricts the growth of roots, trees may be uprooted during periods of strong winds or heavy snowfall.

Community Development

Suitability: Limited

Management considerations:

- The slope, the hazard of erosion, and the depth to bedrock are management concerns in areas of the Gilpin and Peabody soils. Additional concerns in areas of the Peabody soil are the high shrink-swell potential, the hazard of soil slippage, and the slow permeability.
- Land shaping and grading can help overcome the slope on building sites, but excavating the bedrock on sites for dwellings with basements is difficult.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Selecting areas where the soils are the deepest, oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the depth to bedrock, the slope, and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water will help prevent the road damage caused by slippage and by shrinking and swelling.

Interpretive Group

Land capability classification: 7s

GsF—Gilpin-Peabody complex, 35 to 70 percent slopes, very stony

Setting

Landscape position: On very steep side slopes throughout the county
Note: These two soils occur as areas so closely intermingled that it was impractical to map them separately.

Composition

Gilpin soil: 50 percent
Peabody soil: 30 percent
Inclusions: 20 percent

Typical Profile

Gilpin
Surface layer:
0 to 3 inches—brown silt loam

Subsoil:
3 to 10 inches—brownish yellow silt loam
10 to 23 inches—strong brown channery silty clay loam
23 to 33 inches—yellowish brown very channery silt loam

Bedrock:
33 inches—siltstone

Peabody
Surface layer:
0 to 1 inch—slightly decomposed leaf litter
1 to 3 inches—brown silt loam

Subsoil:
3 to 7 inches—reddish brown silty clay loam
7 to 21 inches—reddish brown clay
21 to 27 inches—reddish brown very channery silty clay

Bedrock:
27 to 33 inches—pale olive, soft mudstone
33 inches—reddish brown, hard siltstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Gilpin—moderate; Peabody—slow
Available water capacity: Gilpin—moderate or high; Peabody—low or moderate
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: None
Shrink-swell potential: Gilpin—low; Peabody—high
Erosion hazard: Very severe
Slope class: Very steep
Stoniness: Very stony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Gilpin—very strongly acid or strongly acid, except where lime has been applied; Peabody—very strongly acid to slightly acid in the solum and strongly acid or moderately acid in the substratum, except where lime has been applied
Organic matter content in the surface layer: Low to moderate

Surface runoff: Very rapid
Depth to bedrock: 20 to 40 inches
Bedrock: Interbedded shale, mudstone, siltstone, and some sandstone
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that are less than 20 inches deep over bedrock
- Rock outcrop
- Small areas of soils that have sandier textures and more rock fragments in the soil profile than the Gilpin and Peabody soils

Nonlimiting inclusions:
- Soils that are more than 40 inches deep over bedrock
- Soils that are on benches or have slopes of less than 35 percent and that are relatively common but cannot be delineated at the scale of mapping
- Narrow areas of colluvial and alluvial soils that are along intermittent streams in hollows throughout the survey area but are too small to delineate at the scale of mapping
- Areas where the surface stones have been removed in order to make agricultural management easier

Use and Management

Most areas of this unit are wooded. Some areas have been cleared and are used as pasture.

Cropland
Suitability: Unsuited
Management considerations:
- Operation of conventional farm machinery is difficult because of the slope and the surface stoniness.
- The hazard of erosion is a major management concern.
- A suitable alternative site should be selected.

Pasture and Hayland
Suitability: Unsuited to hay and difficult to manage for pasture
Management considerations:
- Operation of conventional farm machinery used in clipping and applying fertilizer is difficult because of the slope and the surface stoniness.
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Gilpin—moderately high; Peabody—moderately high on north aspects and moderate on south aspects
Management considerations:
- The major management concerns are the equipment limitation; the hazard of erosion on roads, skid trails, and log landings; plant competition; the hazard of windthrow; and, on south aspects, seedling mortality.

- Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when these soils are wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soils are wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Because of the slope, cable yarding systems are generally safer than other logging methods and result in less surface disturbance.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.
- Because the depth to bedrock restricts the growth of roots, trees may be uprooted during periods of strong winds or heavy snowfall (fig. 5).

Community Development
Suitability: Unsuited
Management considerations:
- The slope, the hazard of erosion, and the depth to bedrock are management concerns in areas of the Gilpin and Peabody soils. Additional concerns in areas of the Peabody soil are the high shrink-swell potential, the hazard of soil slippage, and the slow permeability.
- A suitable alternative site should be selected.

Interpretive Group

Land capability classification: 7s

GuC—Gilpin-Upshur complex, 8 to 15 percent slopes

Setting

Landscape position: On ridges throughout the county
Note: These two soils occur as areas so closely intermingled that it was impractical to map them separately.

Composition

Gilpin soil: 40 percent
Upshur soil: 40 percent
Inclusions: 20 percent

Figure 5.—Windthrow in an area of Gilpin-Peabody complex, 35 to 70 percent slopes, very stony. It is a hazard in areas of these soils because both of the soils are only moderately deep.

Typical Profile

Gilpin
Surface layer:
0 to 3 inches—brown silt loam

Subsoil:
3 to 10 inches—brownish yellow silt loam
10 to 23 inches—strong brown channery silty clay loam
23 to 33 inches—yellowish brown very channery silt loam

Bedrock:
33 inches—siltstone

Upshur
Surface layer:
0 to 2 inches—very dark grayish brown silt loam

Subsurface layer:
2 to 6 inches—brown silt loam

Subsoil:
6 to 11 inches—reddish brown silty clay
11 to 20 inches—dark reddish brown clay
20 to 35 inches—reddish brown clay
35 to 46 inches—dusky red clay

Substratum:
46 to 57 inches—dusky red silty clay loam

Bedrock:
57 inches—pale olive, soft siltstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Gilpin—moderate; Upshur—slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: None
Shrink-swell potential: Gilpin—low; Upshur—high
Erosion hazard: Severe
Slope class: Strongly sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Gilpin—very strongly acid or strongly acid, except where lime has been applied; Upshur—very strongly acid to slightly acid in the A and BA horizons and very strongly acid to moderately acid in the Bt, BC, and C horizons, except where lime has been applied
Organic matter content in the surface layer: Low to moderate
Surface runoff: Rapid
Depth to bedrock: Gilpin—20 to 40 inches; Upshur—40 to 60 inches
Bedrock: Interbedded shale, siltstone, and some sandstone
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 15 percent
- Small areas of soils that have stones at the surface
- Small areas of soils that are less than 20 inches deep over bedrock
- Small areas of moderately well drained soils in depressions

Nonlimiting inclusions:
- Soils that have slopes of less than 8 percent; on broad ridgetops
- Soils that are more than 60 inches deep over bedrock

Use and Management

These soils are used as pasture, hayland, or woodland.

Cropland
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland
Suitability: Suited

Management considerations:
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Gilpin—moderately high; Upshur—moderate
Management considerations:
- The hazard of erosion on roads, skid trails, and log landings and plant competition are the major management concerns.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when these soils are wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soils are wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development
Suitability: Limited
Management considerations:
- The slope and the hazard of erosion are management concerns in areas of the Gilpin and Upshur soils. Additional concerns are the depth to bedrock and frost action in areas of the Gilpin soil and the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength in areas of the Upshur soil.
- Land shaping and grading can help overcome the slope on building sites, but excavating the bedrock on sites for dwellings with basements is difficult.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.

- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on building sites.
- Selecting areas where the soils are the deepest, oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the depth to bedrock, the slope, and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material to the depth of frost penetration, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water will help prevent the road damage caused by low strength, by shrinking and swelling, and by frost action.

Interpretive Group

Land capability classification: Gilpin—3e; Upshur—4e

GuD—Gilpin-Upshur complex, 15 to 25 percent slopes

Setting

Landscape position: On ridges, benches, and side slopes throughout the county
Note: These two soils occur as areas so closely intermingled that it was impractical to map them separately.

Composition

Gilpin soil: 40 percent
Upshur soil: 40 percent
Inclusions: 20 percent

Typical Profile

Gilpin
Surface layer:
0 to 3 inches—brown silt loam

Subsoil:
3 to 10 inches—brownish yellow silt loam
10 to 23 inches—strong brown channery silty clay loam
23 to 33 inches—yellowish brown very channery silt loam

Bedrock:
33 inches—siltstone

Upshur
Surface layer:
0 to 2 inches—very dark grayish brown silt loam

Subsurface layer:
2 to 6 inches—brown silt loam

Subsoil:
6 to 11 inches—reddish brown silty clay
11 to 20 inches—dark reddish brown clay
20 to 35 inches—reddish brown clay
35 to 46 inches—dusky red clay

Substratum:
46 to 57 inches—dusky red silty clay loam

Bedrock:
57 inches—pale olive, soft siltstone

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Gilpin—moderate; Upshur—slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: None
Shrink-swell potential: Gilpin—low; Upshur—high
Erosion hazard: Severe
Slope class: Moderately steep
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Gilpin—very strongly acid or strongly acid, except where lime has been applied; Upshur—very strongly acid to slightly acid in the A and BA horizons and very strongly acid to moderately acid in the Bt, BC, and C horizons, except where lime has been applied
Organic matter content in the surface layer: Low to moderate
Surface runoff: Rapid
Depth to bedrock: Gilpin—20 to 40 inches; Upshur—40 to 60 inches
Bedrock: Interbedded shale, siltstone, and some sandstone
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 25 percent
- Small areas of soils that have stones at the surface
- Soils that are less than 20 inches deep over bedrock
- Small areas of moderately well drained soils in depressions

Nonlimiting inclusions:
- Soils that have slopes of less than 15 percent
- Soils that are more than 60 inches deep over bedrock
- Vandalia soils on footslopes

Use and Management

These soils are used as pasture, hayland, or woodland.

Cropland
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands

may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland

Suitability: Suited

Management considerations:

- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland

Potential productivity: Gilpin—moderately high; Upshur—moderate or moderately high

Management considerations:

- The main management concerns are the hazard of erosion on roads, skid trails, and log landings; plant competition; and, on south aspects, seedling mortality. Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when these soils are wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soils are wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.

Community Development

Suitability: Limited

Management considerations:

- The slope, the hazard of erosion, and the depth to bedrock are management concerns in areas of the Gilpin soil. The slope, the hazard of erosion, the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength are management concerns in areas of the Upshur soil.
- Land shaping and grading can help overcome the slope on building sites, but excavating the bedrock on sites for dwellings with basements is difficult.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.

- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Selecting areas where the soils are the deepest, oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the depth to bedrock, the slope, and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: Gilpin—4e; Upshur—6e

GyD—Gilpin-Upshur-Urban land complex, 15 to 25 percent slopes

Setting

Landscape position: On ridges, benches, and side slopes, mainly in West Union
Note: These two soils and the Urban land occur as areas so closely intermingled that it was impractical to map them separately.

Composition

Gilpin soil: 40 percent
Upshur soil: 30 percent
Urban land: 20 percent
Inclusions: 10 percent

Typical Profile

Gilpin
Surface layer:
0 to 3 inches—brown silt loam

Subsoil:
3 to 10 inches—brownish yellow silt loam
10 to 23 inches—strong brown channery silty clay loam
23 to 33 inches—yellowish brown very channery silt loam

Bedrock:
33 inches—siltstone

Upshur
Surface layer:
0 to 2 inches—very dark grayish brown silt loam

Subsurface layer:
2 to 6 inches—brown silt loam

Subsoil:
6 to 11 inches—reddish brown silty clay
11 to 20 inches—dark reddish brown clay
20 to 35 inches—reddish brown clay
35 to 46 inches—dusky red clay

Substratum:
46 to 57 inches—dusky red silty clay loam

Bedrock:
57 inches—pale olive, soft siltstone

Urban land

No typical profile is given for Urban land. The Urban land consists of areas covered by buildings, streets, parking lots, and other structures.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Gilpin—moderate; Upshur—slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: None
Shrink-swell potential: Gilpin—low; Upshur—high
Erosion hazard: Severe
Slope class: Moderately steep
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Gilpin—very strongly acid or strongly acid, except where lime has been applied; Upshur—very strongly acid to slightly acid in the A and BA horizons and very strongly acid to moderately acid in the Bt, BC, and C horizons, except where lime has been applied
Organic matter content in the surface layer: Low to moderate
Surface runoff: Rapid
Depth to bedrock: Gilpin—20 to 40 inches; Upshur—40 to 60 inches
Bedrock: Interbedded shale, siltstone, and some sandstone
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 25 percent
- Soils that are less than 20 inches deep over bedrock
- Small areas of moderately well drained soils in depressions

Nonlimiting inclusions:
- Soils that have slopes of less than 15 percent
- Soils that are more than 60 inches deep over bedrock
- Monongahela soils
- Vandalia soils on footslopes

Use and Management

This unit is used for urban development.

Garden Areas
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- Tilling across the slope, applying crop residue management, and growing winter cover crops help to prevent excessive soil loss.
- Crop residue management, green manure crops, applications of animal manure or composted material, cover crops, conservation tillage, and tilling at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland
This unit is unsuitable as pasture and hayland because it is used for urban development.

Woodland
This area is unsuitable for timber production because it is used for urban development.

Community Development
Suitability: Limited
Management considerations:
- The slope, the hazard of erosion, and the depth to bedrock are management concerns in areas of the Gilpin soil. The slope, the hazard of erosion, the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength are management concerns in areas of the Upshur soil.
- Land shaping and grading can help overcome the slope on building sites, but excavating the bedrock on sites for dwellings with basements is difficult.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Selecting areas where the soils are the deepest, oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the depth to bedrock, the slope, and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.

- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: Gilpin—4e; Upshur—6e; Urban land—unassigned

Ha—Hackers silt loam

Setting

Landscape position: Nearly level, high flood plains along Middle Island Creek

Composition

Hackers soil: 80 percent
Inclusions: 20 percent

Typical Profile

Surface layer:
0 to 8 inches—brown silt loam

Subsoil:
8 to 38 inches—reddish brown silty clay loam
38 to 44 inches—yellowish red silt loam

Substratum:
44 to 65 or more inches—reddish brown silt loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: Rare
Shrink-swell potential: Moderate
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Strongly acid or moderately acid, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: Yes

Inclusions

Limiting inclusions:
- Chagrin soils that are subject to occasional flooding
- Small areas of moderately well drained soils
- Vandalia soils on footslopes
- Small areas of soils that have slopes of more than 3 percent

Nonlimiting inclusions:
- Soils that have more sand throughout the profile than the Hackers soil

Use and Management

This soil is used as hayland, pasture, or woodland.

Cropland
Suitability: Suited
Management considerations:
- The hazard of erosion, soil tilth, streambank erosion, and flooding are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, application of manure, cover crops, conservation tillage, and tillage and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely delays field operations or damages crops.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, overgrazing, streambank erosion, and the flooding are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.
- Streambanks should be fenced. Livestock access to streams should be limited to protected crossings. Bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely deposits debris on the grassland.

Woodland
Potential productivity: Moderately high
Management considerations:
- Plant competition is a major management concern.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development

Suitability: Limited

Management considerations:

- The flooding is a limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets. Low soil strength and frost action are also major management concerns.
- Constructing local roads and streets on raised fill material and adding coarse grained base material to the depth of frost penetration will help to prevent the road damage caused by flooding and frost action.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength.
- A better suited soil that is out of the flood plain should be selected.

Interpretive Group

Land capability classification: 1

Ka—Kanawha loam

Setting

Landscape position: Nearly level, high flood plains along the major streams

Composition

Kanawha soil: 85 percent
Inclusions: 15 percent

Typical Profile

Surface layer:
0 to 4 inches—dark brown loam
4 to 9 inches—brown loam

Subsurface layer:
9 to 14 inches—dark yellowish brown loam

Subsoil:
14 to 24 inches—brown loam
24 to 40 inches—brown clay loam
40 to 54 inches—brown loam
54 to 65 or more inches—brown loam

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: Rare
Shrink-swell potential: Low
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Strongly acid to neutral in the Ap and BA horizons and in the upper part of the Bt horizon and moderately acid to neutral in the lower part of the Bt horizon and in the BC and C horizons, except where lime has been applied

Organic matter content in the surface layer: Moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: Yes

Inclusions

Limiting inclusions:
- Chagrin soils that are subject to occasional flooding
- Small areas of moderately well drained soils
- The gently sloping Sensabaugh soils that are subject to rare flooding and are mainly on alluvial fans
- Vandalia soils on footslopes
- Small areas of soils that have slopes of more than 3 percent

Nonlimiting inclusions:
- Soils that have more silt throughout the profile than the Kanawha soil

Use and Management

Most areas of this soil have been cleared and are used for hay and pasture (fig. 6). Some small areas are wooded, and other small areas are used for urban development.

Cropland
Suitability: Suited
Management considerations:
- The hazard of erosion, soil tilth, streambank erosion, and the flooding are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.

Figure 6.—A pastured area of Kanawha loam. This soil is considered to be prime farmland.

- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely delays field operations or damages crops.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, overgrazing, streambank erosion, and the flooding are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.
- Streambanks should be fenced. Livestock access to streams should be limited to protected crossings. Bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely deposits debris on the grassland.

Woodland
Potential productivity: Moderately high
Management considerations:
- Plant competition is a major management concern.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development
Suitability: Limited
Management considerations:
- The flooding is a limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets. The slow permeability and frost action are also major management concerns.
- Constructing local roads and streets on raised fill material and adding coarse grained base material to the depth of frost penetration will help to prevent the road damage caused by flooding and frost action.
- Oversizing the absorption field, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the slow permeability on sites for septic tank absorption fields.
- A better suited soil that is out of the flood plain should be selected.

Interpretive Group

Land capability classification: 1

Ku—Kanawha-Urban land complex

Setting

Landscape position: Nearly level flood plains along Meathouse Fork and Middle Island Creek

Composition

Kanawha soil: 65 percent
Urban land: 20 percent
Inclusions: 15 percent

Typical Profile

Kanawha
Surface layer:
0 to 4 inches—dark brown loam
4 to 9 inches—brown loam

Subsurface layer:
9 to 14 inches—dark yellowish brown loam

Subsoil:
14 to 24 inches—brown loam
24 to 40 inches—brown clay loam
40 to 54 inches—brown loam
54 to 65 or more inches—brown loam

Urban land
No typical profile is given for Urban land. The Urban land consists of areas covered by buildings, streets, parking lots, and other structures.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Depth to a seasonal high water table: More than 6 feet
Hazard of flooding: Rare
Shrink-swell potential: Low
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Strongly acid to neutral in the Ap and BA horizons and in the upper part of the Bt horizon and moderately acid to neutral in the lower part of the Bt horizon and in the BC and C horizons, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 3 percent
- Chagrin soils that are subject to occasional flooding
- The gently sloping Sensabaugh soils that are subject to rare flooding and are mainly on alluvial fans

Use and Management

This unit is used for urban development.

Garden Areas
Suitability: Suited
Management considerations:
- Soil tilth, streambank erosion, and the flooding are major management concerns.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Crop residue management, green manure crops, applications of animal manure or composted material, cover crops, conservation tillage, and tilling at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely delays garden preparation and planting or damages crops.

Pasture and Hayland
This unit is unsuitable as pasture and hayland because it is used for urban development.

Woodland
This unit is unsuitable for timber production because it is used for urban development.

Community Development
Suitability: Limited
Management considerations:
- The flooding is a limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets. The slow permeability and frost action are also major management concerns.
- Constructing local roads and streets on raised fill material and adding coarse grained base material to the depth of frost penetration will help to prevent the road damage caused by flooding and frost action.
- A better suited soil that is out of the flood plain should be selected.
- Oversizing the absorption field, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the slow permeability on sites for septic tank absorption fields.

Interpretive Group

Land capability classification: Kanawha—1; Urban land—unassigned

Me—Melvin silt loam

Setting

Landscape position: High flood plains throughout the county

Composition

Melvin soil: 75 percent
Inclusions: 25 percent

Typical Profile

Surface layer:
0 to 4 inches—dark grayish brown silt loam with dark gray mottles
4 to 9 inches—brown silt loam with dark gray and yellowish brown mottles

Subsoil:
9 to 36 inches—light brownish gray silt loam with gray and strong brown mottles

Substratum:
36 to 65 or more inches—grayish brown silt loam with gray and strong brown mottles

Soil Properties and Qualities

Drainage class: Poorly drained
Permeability: Moderate
Available water capacity: High
Depth to a seasonal high water table: Within 0.5 foot
Hazard of flooding: Rare
Shrink-swell potential: Low
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Moderately acid to neutral, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Nonlimiting inclusions:
- Somewhat poorly drained soils
- Moderately well drained Cotaco soils
- Well drained Chagrin soils that are subject to occasional flooding

Use and Management

Most areas of this soil have been cleared and are used for hay and pasture. Some small areas are wooded.

Cropland
Suitability: Limited
Management considerations:
- The wetness, the hazard of erosion, soil tilth, and the flooding are major management concerns.

- Installing a subsurface drainage system helps to overcome the wetness if a suitable outlet is available.
- Water-tolerant species should be selected for planting.
- A crop rotation that includes close-growing crops or grasses and legumes, conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- The flooding rarely delays field operations or damages crops, but ponding may do both.

Pasture and Hayland
Suitability: Limited
Management considerations:
- The wetness, the hazard of erosion, establishing and maintaining a mixture of grasses and legumes, overgrazing, and flooding are major management concerns.
- Restricted grazing during wet periods helps to prevent compaction and poor tilth.
- Water-tolerant species should be selected for seeding.
- Proper stocking rates, pasture rotation, timely deferment of grazing, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.
- The flooding rarely deposits debris on the grassland.

Woodland
Potential productivity: High
Management considerations:
- The wetness, plant competition, seedling mortality, and the equipment limitation are major management concerns.
- Because of wetness, plant competition, and seedling mortality, trees are generally not planted in areas of this soil.
- If trees are planted, the species that can withstand the seasonal wetness should be selected for planting.
- This soil is soft when wet. The use of logging equipment during wet periods will result in excessive rutting.

Community Development
Suitability: Limited
Management considerations:
- The flooding, the wetness, and low strength are major management concerns.
- A suitable alternative site should be selected.

Interpretive Group

Land capability classification: 3w

MoB—Monongahela silt loam, 3 to 8 percent slopes

Setting

Landscape position: High stream terraces along the major streams in the county

Composition

Monongahela soil: 85 percent
Inclusions: 15 percent

Typical Profile

Surface layer:
0 to 8 inches—brown silt loam

Subsurface layer:
8 to 12 inches—dark yellowish brown silt loam

Subsoil:
12 to 22 inches—yellowish brown silt loam
22 to 33 inches—yellowish brown silt loam with light brownish gray mottles
33 to 51 inches—yellowish brown clay loam with light gray mottles
51 to 65 or more inches—yellowish red channery clay loam with light brownish gray mottles

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Slow in the fragipan
Available water capacity: Moderate or high
Depth to a seasonal high water table: 1.5 to 3.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Erosion hazard: Moderate
Slope class: Gently sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Strongly acid or very strongly acid, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Medium
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 8 percent
- Vandalia soils on footslopes
- Soils on short, steep and very steep slopes that are adjacent to flood plains

Nonlimiting inclusions:
- Soils that have slopes of less than 3 percent
- Soils that do not have a fragipan
- Well drained soils

Use and Management

This soil is used for hay and pasture (fig. 7).

Figure 7.—An area of Monongahela silt loam, 3 to 8 percent slopes, used for hay and pasture. Monongahela is the State Soil of West Virginia.

Cropland

Suitability: Suited

Management considerations:

- The hazard of erosion and soil tilth are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland

Suitability: Suited

Management considerations:

- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland

Potential productivity: Moderately high

Management considerations:

- Plant competition and a seasonal high water table are major management concerns.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when this soil is wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soil is wet causes excessive rutting.

Community Development

Suitability: Limited

Management considerations:

- A seasonal high water table, the slow permeability, the hazard of erosion, and frost action are major management concerns.
- Sealing foundations, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to keep basements dry and to overcome the seasonal high water table on building sites.
- Oversizing the absorption field, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help overcome the seasonal high water table and the slow permeability on sites for septic tank absorption fields.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Because the soil is soft when wet, the pavement cracks under heavy loads if roads are improperly constructed. Using coarse grained base material to the depth of frost penetration, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water will help prevent the damage caused by wetness and frost action.

Interpretive Group

Land capability classification: 2e

MoC—Monongahela silt loam, 8 to 15 percent slopes

Setting

Landscape position: High stream terraces along the major streams in the county

Composition

Monongahela soil: 70 percent
Inclusions: 30 percent

Typical Profile

Surface layer:
0 to 8 inches—brown silt loam

Subsurface layer:
8 to 12 inches—dark yellowish brown silt loam

Subsoil:
12 to 22 inches—yellowish brown silt loam
22 to 33 inches—yellowish brown silt loam with light brownish gray mottles
33 to 51 inches—yellowish brown clay loam with light gray mottles
51 to 65 or more inches—yellowish red channery clay loam with light brownish gray mottles

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Slow in the fragipan
Available water capacity: Moderate or high
Depth to a seasonal high water table: 1.5 to 3.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Erosion hazard: Severe
Slope class: Strongly sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Strongly acid or very strongly acid, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Medium
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 15 percent
- Gilpin and Upshur soils in areas where the alluvial cap has been removed by erosion
- Vandalia soils on footslopes

Nonlimiting inclusions:
- Soils that have slopes of less than 8 percent
- Soils that do not have a fragipan
- Well drained soils

Use and Management

This soil is used for hay and pasture.

Cropland
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.

- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Moderately high
Management considerations:
- The hazard of erosion, plant competition, and the seasonal high water table are major management concerns.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when this soil is wet and can be impassable during rainy periods. Operating wheeled and tracked equipment when the soil is wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development
Suitability: Limited
Management considerations:
- The seasonal high water table, the slow permeability, the slope, the hazard of erosion, and frost action are major management concerns.
- Sealing foundations, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to keep basements dry and to overcome the seasonal high water table on building sites.
- Oversizing the absorption field, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help overcome the seasonal high water table and the slow permeability on sites for septic tank absorption fields.

- Land shaping and grading can help overcome the slope on building sites.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Because the soil is soft when wet, the pavement cracks under heavy loads if roads are improperly constructed. Using coarse grained base material to the depth of frost penetration, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water will help to prevent the road damage caused by wetness and frost action.

Interpretive Group

Land capability classification: 3e

MuB—Monongahela-Urban land complex, 3 to 8 percent slopes

Setting

Landscape position: High stream terraces along Middle Island Creek, including areas in West Union and Smithburg

Composition

Monongahela soil: 50 percent
Urban land: 35 percent
Inclusions: 15 percent

Typical Profile

Monongahela
Surface layer:
0 to 8 inches—brown silt loam

Subsurface layer:
8 to 12 inches—dark yellowish brown silt loam

Subsoil:
12 to 22 inches—yellowish brown silt loam
22 to 33 inches—yellowish brown silt loam with light brownish gray mottles
33 to 51 inches—yellowish brown clay loam with light gray mottles
51 to 65 or more inches—yellowish red channery clay loam with light brownish gray mottles

Urban land
No typical profile is given for Urban land. The Urban land consists of areas covered by buildings, streets, parking lots, and other structures.

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Slow in the fragipan
Available water capacity: Moderate or high
Depth to a seasonal high water table: 1.5 to 3.0 feet

Hazard of flooding: None
Shrink-swell potential: Low
Erosion hazard: Moderate
Slope class: Gently sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Strongly acid or very strongly acid, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Medium
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 8 percent
- Vandalia soils on footslopes
- Gilpin and Upshur soils in some of the higher landscape positions where the alluvial cap has been removed by erosion or during construction

Nonlimiting inclusions:
- Soils that have slopes of less than 3 percent
- Soils that do not have a fragipan
- Well drained soils

Use and Management

This unit is used for urban development.

Garden Areas
Suitability: Suited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Tilling the soil across the slope, crop residue management, and growing winter cover crops help to prevent excessive soil loss.
- Crop residue management, green manure crops, applications of animal manure or composted material, cover crops, conservation tillage, and tilling at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.

Pasture and Hayland
This unit is unsuitable as pasture and hayland because it is used for urban development.

Woodland
This unit is unsuitable for timber production because it is used for urban development.

Community Development
Suitability: Limited
Management considerations:
- The seasonal high water table, the slow permeability, the hazard of erosion, and frost action are major management concerns.

- Sealing foundations, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to keep basements dry and to overcome the seasonal high water table on building sites.
- Oversizing the absorption field, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help overcome the seasonal high water table and the slow permeability on sites for septic tank absorption fields.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Because the Monongahela soil is soft when wet, the pavement cracks under heavy loads if roads are improperly constructed. Using coarse grained base material to the depth of frost penetration, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water will help prevent the road damage caused by wetness and frost action.

Interpretive Group

Land capability classification: Monongahela—2e; Urban land—unassigned

MuC—Monongahela-Urban land complex, 8 to 15 percent slopes

Setting

Landscape position: High stream terraces along Middle Island Creek, including areas in West Union and Smithburg

Composition

Monongahela soil: 45 percent
Urban land: 30 percent
Inclusions: 25 percent

Typical Profile

Monongahela
Surface layer:
0 to 8 inches—brown silt loam

Subsurface layer:
8 to 12 inches—dark yellowish brown silt loam

Subsoil:
12 to 22 inches—yellowish brown silt loam
22 to 33 inches—yellowish brown silt loam with light brownish gray mottles
33 to 51 inches—yellowish brown clay loam with light gray mottles
51 to 65 or more inches—yellowish red channery clay loam with light brownish gray mottles

Urban land
No typical profile is given for Urban land. The Urban land consists of areas covered by buildings, streets, parking lots, and other structures.

Soil Properties and Qualities

Drainage class: Moderately well drained
Permeability: Slow in the fragipan
Available water capacity: Moderate or high
Depth to a seasonal high water table: 1.5 to 3.0 feet
Hazard of flooding: None
Shrink-swell potential: Low
Erosion hazard: Severe
Slope class: Strongly sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Strongly acid or very strongly acid, except where lime has been applied
Organic matter content in the surface layer: Moderate
Surface runoff: Rapid
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 15 percent
- Vandalia soils on footslopes
- Gilpin and Upshur soils in areas where the alluvial cap has been removed by erosion or during construction

Nonlimiting inclusions:
- Soils that have slopes of less than 8 percent
- Soils that do not have a fragipan
- Well drained soils

Use and Management

This unit is used for urban development.

Garden Areas
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Tilling the soil across the slope, crop residue management, and growing winter cover crops help to prevent excessive soil loss.
- Crop residue management, green manure crops, applications of animal manure or composted material, cover crops, conservation tillage, and tilling at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.

Pasture and Hayland
This unit is unsuitable as pasture and hayland because it is used for urban development.

Woodland
This unit is unsuitable for timber production because it is used for urban development.

Community Development
Suitability: Limited
Management considerations:
- The seasonal high water table, the slow permeability, the slope, the hazard of erosion, and frost action are major management concerns.
- Sealing foundations, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to keep basements dry and to overcome the seasonal high water table on building sites.
- Oversizing the absorption field, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help overcome the seasonal high water table and the slow permeability on sites for septic tank absorption fields.
- Land shaping and grading can help overcome the slope on building sites.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Because the soil is soft when wet, the pavement cracks under heavy loads if roads are improperly constructed. Using coarse grained base material to the depth of frost penetration, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water will help overcome the seasonal high water table and frost action on sites for local roads and streets.

Interpretive Group

Land capability classification: Monongahela—3e; Urban land—unassigned

Se—Sensabaugh silt loam

Setting

Landscape position: Nearly level flood plains throughout the county

Composition

Sensabaugh soil: 75 percent
Inclusions: 25 percent

Typical Profile

Surface layer:
0 to 6 inches—brown silt loam

Subsoil:
6 to 19 inches—brown silt loam
19 to 25 inches—brown loam
25 to 30 inches—brown channery loam with brown and strong brown mottles

Substratum:
30 to 39 inches—dark yellowish brown very channery sandy loam
39 to 49 inches—dark yellowish brown extremely channery sandy loam
49 to 65 or more inches—dark yellowish brown channery sandy loam with greenish gray, pale green, reddish brown, and olive mottles

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate or moderately rapid
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: Occasional
Shrink-swell potential: Low
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Moderately acid to neutral, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: Yes

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 3 percent
- Soils that are in low areas and subject to frequent flooding
- Poorly drained and somewhat poorly drained soils
- Soils that have more rock fragments in the profile than the Sensabaugh soil
- Vandalia soils on footslopes
- Gilpin, Upshur, and Peabody soils near the edge of mapped areas of the Sensabaugh soil

Nonlimiting inclusions:
- The Sensabaugh soils that are subject to rare flooding and are on alluvial fans and at the head of some streams
- Chagrin soils
- Soils that have sandier textures in the lower part of the subsoil and in the substratum than those of the Sensabaugh soil

Use and Management

Most areas of this soil have been cleared and are used for hay and pasture. A few small areas are wooded. The included areas of Vandalia soils and the rarely flooded Sensabaugh soils are commonly used for urban development.

Cropland
Suitability: Suited
Management considerations:
- The flooding, streambank erosion, and soil tilth are major management concerns.
- The flooding occasionally delays field operations or damages crops.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, helps to prevent streambank erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland

Suitability: Suited

Management considerations:

- The flooding, streambank erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- The flooding occasionally deposits debris on the grassland.
- Streambanks should be fenced. Livestock access to streams should be limited to protected crossings. Bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland

Potential productivity: High

Management considerations:

- Plant competition and seedling mortality are major management concerns.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.

Community Development

Suitability: Limited

Management considerations:

- The flooding is a severe limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets.
- Constructing local roads and streets on raised fill material and adding coarse grained base material help to prevent the damage caused by flooding.
- A better suited soil that is out of the flood plain should be selected.

Interpretive Group

Land capability classification: 2w

SeB—Sensabaugh silt loam, 3 to 8 percent slopes, rarely flooded

Setting

Landscape position: Gently sloping flood plains and alluvial fans throughout the county

Composition

Sensabaugh soil: 80 percent
Inclusions: 20 percent

Typical Profile

Surface layer:
0 to 6 inches—brown silt loam

Subsoil:
6 to 19 inches—brown silt loam
19 to 25 inches—brown loam
25 to 30 inches—brown channery loam with brown and strong brown mottles

Substratum:
30 to 39 inches—dark yellowish brown very channery sandy loam
39 to 49 inches—dark yellowish brown extremely channery sandy loam
49 to 65 or more inches—dark yellowish brown channery sandy loam with greenish gray, pale green, reddish brown, and olive mottles

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate or moderately rapid
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: Rare
Shrink-swell potential: Low
Erosion hazard: Moderate
Slope class: Gently sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Moderately acid to neutral, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Medium
Depth to bedrock: More than 65 inches
Prime farmland: Yes

Inclusions

Limiting inclusions:
- The occasionally flooded Sensabaugh and Chagrin soils
- Moderately well drained soils
- Soils that have slopes of more than 8 percent
- Vandalia soils on footslopes
- Soils that have more rock fragments in the profile than the Sensabaugh soil
- Gilpin and Peabody soils near the edge of mapped areas of the Sensabaugh soil

Nonlimiting inclusions:
- Soils that have slopes of less than 3 percent
- Kanawha and Cotaco soils on some of the high flood plains
- Soils that have fewer rock fragments in the profile than the Sensabaugh soil

Use and Management

Most areas of this soil have been cleared and are used for hay and pasture. Some areas are used as sites for urban development, and a limited number of acres is used as woodland.

Cropland
Suitability: Suited
Management considerations:
- The hazard of erosion, soil tilth, streambank erosion, and the flooding are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.

- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely delays field operations or damages crops.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, overgrazing, streambank erosion, and the flooding are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.
- Streambanks should be fenced. Livestock access to streams should be limited to protected crossings. Bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely deposits debris on the grassland.

Woodland
Potential productivity: High
Management considerations:
- Plant competition and seedling mortality are major management concerns.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.

Community Development
Suitability: Limited
Management considerations:
- The flooding is a limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets.
- Constructing local roads and streets on raised fill material and adding coarse grained base material help to prevent the damage caused by flooding.
- A better suited soil that is out of the flood plain should be selected.

Interpretive Group

Land capability classification: 2e

Su—Sensabaugh-Urban land complex

Setting

Landscape position: Nearly level flood plains throughout the county

Composition

Sensabaugh soil: 60 percent
Urban land: 25 percent
Inclusions: 15 percent

Typical Profile

Sensabaugh
Surface layer:
0 to 6 inches—brown silt loam

Subsoil:
6 to 19 inches—brown silt loam
19 to 25 inches—brown loam
25 to 30 inches—brown channery loam with brown and strong brown mottles

Substratum:
30 to 39 inches—dark yellowish brown very channery sandy loam
39 to 49 inches—dark yellowish brown extremely channery sandy loam
49 to 65 or more inches—dark yellowish brown channery sandy loam with greenish gray, pale green, reddish brown, and olive mottles

Urban land
No typical profile is given for Urban land. The Urban land consists of areas covered by buildings, streets, parking lots, and other structures.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate or moderately rapid
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: Occasional
Shrink-swell potential: Low
Erosion hazard: Slight
Slope class: Nearly level
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Moderately acid to neutral, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Slow or medium
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 3 percent
- Soils that have more rock fragments in the profile than the Sensabaugh soil

Nonlimiting inclusions:
- Soils that have sandier textures in the subsoil and substratum than the Sensabaugh soil
- Sensabaugh soils that are subject to rare flooding and are on alluvial fans

Use and Management

This unit is used for urban development.

Garden Areas
Suitability: Suited
Management considerations:
- The flooding, soil tilth, and streambank erosion are major management concerns.
- The flooding occasionally delays garden preparation and planting or damages crops.
- Crop residue management, green manure crops, application of animal manure or composted material, cover crops, conservation tillage, and tilling at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrients, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching and ground-water pollution.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.

Pasture and Hayland
This unit is unsuitable as pasture and hayland because it is used for urban development.

Woodland
This unit is unsuitable for timber production because it is used for urban development.

Community Development
Suitability: Limited
Management considerations:
- The flooding is a severe limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets.
- Dwellings and local roads and streets should be constructed above the known flood level or out of the flood plain.
- A better suited soil that is out of the flood plain should be selected.

Interpretive Group

Land capability classification: Sensabaugh—2w; Urban land—unassigned

SuB—Sensabaugh-Urban land complex, 3 to 8 percent slopes, rarely flooded

Setting

Landscape position: Gently sloping flood plains and alluvial fans throughout the county

Composition

Sensabaugh soil: 70 percent
Urban land: 15 percent
Inclusions: 15 percent

Typical Profile

Sensabaugh
Surface layer:
0 to 6 inches—brown silt loam

Subsoil:
6 to 19 inches—brown silt loam
19 to 25 inches—brown loam
25 to 30 inches—brown channery loam with brown and strong brown mottles

Substratum:
30 to 39 inches—dark yellowish brown very channery sandy loam
39 to 49 inches—dark yellowish brown extremely channery sandy loam
49 to 65 or more inches—dark yellowish brown channery sandy loam with greenish gray, pale green, reddish brown, and olive mottles

Urban land

No typical profile is given for Urban land. The Urban land consists of areas covered by buildings, streets, parking lots, and other structures.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Moderate or moderately rapid
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: Rare
Shrink-swell potential: Low
Erosion hazard: Moderate
Slope class: Gently sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Moderately acid to neutral, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Medium
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- The occasionally flooded Sensabaugh and Chagrin soils
- Moderately well drained soils
- Soils that have slopes of more than 8 percent
- Vandalia soils on footslopes
- Soils that have more rock fragments in the profile than the Sensabaugh soil
- Gilpin and Peabody soils near the edge of mapped areas of this unit

Nonlimiting inclusions:
- Soils that have slopes of less than 3 percent
- Kanawha and Cotaco soils on high flood plains
- Soils that have fewer rock fragments in the profile than the Sensabaugh soil

Use and Management

This unit is used for urban development.

Garden Areas

Suitability: Suited
Management considerations:
- The hazard of erosion, soil tilth, streambank erosion, and the flooding are major management concerns.

- Tilling the soil across the slope, crop residue management, and growing winter cover crops help to prevent excessive soil loss.
- Crop residue management, green manure crops, applications of animal manure or composted material, cover crops, conservation tillage, and tilling at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.
- Maintaining the natural vegetation or using alternative measures, such as bioengineering or installing rock riprap, or both, can help to prevent streambank erosion.
- The flooding rarely delays garden operations or damages crops.

Pasture and Hayland

This unit is unsuitable as pasture and hayland because it is used for urban development.

Woodland

This unit is unsuitable for timber production because it is used for urban development.

Community Development

Suitability: Limited
Management considerations:
- The flooding is a limitation on sites for dwellings with or without basements, septic tank absorption fields, and local roads and streets.
- Constructing local roads and streets on raised fill material and adding coarse grained base material help to prevent the road damage caused by flooding.
- A better suited soil that is out of the flood plain should be selected.

Interpretive Group

Land capability classification: Sensabaugh—2e; Urban land—unassigned

Ud—Udorthents, smoothed

Setting

Landscape position: Along U.S. Route 50 where the soils have been radically disturbed by human activities

Composition

Udorthents: 90 percent
Inclusions: 10 percent

Typical Profile

No typical pedon is given because the soils vary throughout a wide range.

Soil Properties and Qualities

Drainage class: Varies
Permeability: Varies
Available water capacity: Varies

Depth to a seasonal high water table: Varies
Hazard of flooding: Varies
Shrink-swell potential: Varies
Erosion hazard: Varies
Slope class: Nearly level to very steep
Stoniness: Varies
Rockiness: Varies
Natural fertility: Low or medium
Soil reaction: Varies
Organic matter content in the surface layer: Low
Surface runoff: Varies
Depth to bedrock: Varies
Bedrock: Sandstone, siltstone, and shale
Prime farmland: No

Inclusions

Limiting inclusions:
- Vertical rock walls, which are a result of blasting to make the road, along U.S. Route 50

Nonlimiting inclusions:
- Gilpin, Peabody, and Upshur soils on uplands
- Vandalia soils on footslopes
- Sensabaugh and Chagrin soils in the alluvial areas

Use and Management

Most areas of these soils are along U.S. Route 50.

Cropland
Suitability: Unsuited
Management considerations:
- The extreme variability is a major management concern.
- A suitable alternative site should be selected.

Pasture and Hayland
Suitability: Unsuited
Management considerations:
- The extreme variability is a major management concern.
- A suitable alternative site should be selected.

Woodland
Potential productivity: Not rated
Management considerations:
- The extreme variability is a major management concern.
- A suitable alternative site should be selected.

Community Development
Suitability: Unsuited
Management considerations:
- The extreme variability is a major management concern.
- A suitable alternative site should be selected.

Interpretive Group

Land capability classification: Unassigned

VaC—Vandalia silt loam, 8 to 15 percent slopes

Setting

Landscape position: Footslopes and alluvial fans throughout the county

Composition

Vandalia soil: 90 percent
Inclusions: 10 percent

Typical Profile

Surface layer:
0 to 6 inches—dark brown silt loam

Subsurface layer:
6 to 10 inches—brown channery silty clay loam

Subsoil:
10 to 17 inches—brown channery silty clay
17 to 24 inches—strong brown silty clay
24 to 33 inches—reddish brown clay
33 to 60 inches—reddish brown silty clay

Substratum:
60 to 65 or more inches—reddish brown channery silty clay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: None
Shrink-swell potential: High
Erosion hazard: Severe
Slope class: Strongly sloping
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Very strongly acid to moderately acid in the solum and very strongly acid to neutral in the substratum, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Rapid
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 15 percent
- Soils that are less than 65 inches deep over bedrock
- Moderately well drained soils
- Gilpin or Peabody soils
- The Sensabaugh soils that are subject to rare or occasional flooding and are on alluvial fans and narrow flood plains

Nonlimiting inclusions:
- Soils that have slopes of less than 8 percent
- Upshur soils

Use and Management

This soil is used as hayland, pasture, or woodland.

Cropland
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Moderately high
Management considerations:
- The hazard of erosion on roads, skid trails, and log landings and plant competition are major management concerns. Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when this soil is wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soil is wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.

- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.

Community Development
Suitability: Limited
Management considerations:
- The hazard of erosion, the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength are major management concerns.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Oversizing the absorption field, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: 3e

VaD—Vandalia silt loam, 15 to 25 percent slopes

Setting

Landscape position: Footslopes throughout the county

Composition

Vandalia soil: 90 percent
Inclusions: 10 percent

Typical Profile

Surface layer:
0 to 6 inches—dark brown silt loam

Subsurface layer:
6 to 10 inches—brown channery silty clay loam

Subsoil:
10 to 17 inches—brown channery silty clay
17 to 24 inches—strong brown silty clay

24 to 33 inches—reddish brown clay
33 to 60 inches—reddish brown silty clay

Substratum:
60 to 65 or more inches—reddish brown channery silty clay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: None
Shrink-swell potential: High
Erosion hazard: Severe
Slope class: Moderately steep
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Very strongly acid to moderately acid in the solum and very strongly acid to neutral in the substratum, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Rapid
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 25 percent
- Small areas of soils that have stones at the surface
- Soils that are less than 65 inches deep over bedrock
- Moderately well drained soils
- Gilpin and Peabody soils
- The Sensabaugh soils that are subject to rare or occasional flooding and are on alluvial fans and narrow flood plains

Nonlimiting inclusions:
- Soils that have slopes of less than 15 percent
- Upshur soils

Use and Management

This soil is used as pasture, hayland, or woodland.

Cropland
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.
- A crop rotation that includes close-growing crops or grasses and legumes, a system of conservation tillage, cover crops, and crop residue management help to prevent excessive soil loss.
- Establishing grassed waterways and diversions for the safe removal of concentrated runoff helps to prevent gully erosion.
- Crop residue management, green manure crops, applications of manure, cover crops, conservation tillage, and tilling and harvesting at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.

- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland
Suitability: Suited
Management considerations:
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Moderately high
Management considerations:
- The major management concerns are the equipment limitation; the hazard of erosion on roads, skid trails, and log landings; plant competition; and, on south aspects, seedling mortality. Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when this soil is wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soil is wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.

Community Development
Suitability: Limited
Management considerations:
- The slope, the hazard of erosion, the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength are major management concerns.
- Land shaping and grading can help overcome the slope on building sites.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.

- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the slope and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: 4e

VaE—Vandalia silt loam, 25 to 35 percent slopes

Setting

Landscape position: Footslopes throughout the county

Composition

Vandalia soil: 80 percent
Inclusions: 20 percent

Typical Profile

Surface layer:
0 to 6 inches—dark brown silt loam

Subsurface layer:
6 to 10 inches—brown channery silty clay loam

Subsoil:
10 to 17 inches—brown channery silty clay
17 to 24 inches—strong brown silty clay
24 to 33 inches—reddish brown clay
33 to 60 inches—reddish brown silty clay

Substratum:
60 to 65 or more inches—reddish brown channery silty clay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: None

Shrink-swell potential: High
Erosion hazard: Very severe
Slope class: Steep
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Very strongly acid to moderately acid in the solum and very strongly acid to neutral in the substratum, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Very rapid
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 35 percent
- Soils that are less than 65 inches deep over bedrock
- Moderately well drained soils
- Gilpin or Peabody soils
- Soils that have stones at the surface
- The Sensabaugh soils that are subject to rare or occasional flooding and are on alluvial fans and narrow flood plains

Nonlimiting inclusions:
- Soils that have slopes of less than 25 percent
- Upshur soils

Use and Management

This soil is used as pasture, hayland, or woodland.

Cropland
Suitability: Unsuited
Management considerations:
- Operation of most types of conventional farm machinery is difficult because of the slope.
- Erosion is a major management concern.
- A suitable alternative site should be selected.

Pasture and Hayland
Suitability: Limited
Management considerations:
- Operation of most types of conventional farm machinery is difficult because of the slope.
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Moderately high
Management considerations:
- The major management concerns are the equipment limitation; the hazard of erosion on roads, skid trails, and log landings; plant competition; and, on south aspects,

seedling mortality. Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when this soil is wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soil is wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.
- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.

Community Development
Suitability: Limited
Management considerations:
- The slope, the hazard of erosion, the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength are major management concerns.
- Land shaping and grading can help overcome the slope on building sites.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the slope and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: 6e

VsE—Vandalia silt loam, 15 to 35 percent slopes, very stony

Setting

Landscape position: Footslopes throughout the county

Composition

Vandalia soil: 85 percent
Inclusions: 15 percent

Typical Profile

Surface layer:
0 to 6 inches—dark brown silt loam

Subsurface layer:
6 to 10 inches—brown channery silty clay loam

Subsoil:
10 to 17 inches—brown channery silty clay
17 to 24 inches—strong brown silty clay
24 to 33 inches—reddish brown clay
33 to 60 inches—reddish brown silty clay

Substratum:
60 to 65 or more inches—reddish brown channery silty clay

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: None
Shrink-swell potential: High
Erosion hazard: Severe and very severe
Slope class: Moderately steep and steep
Stoniness: Very stony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Very strongly acid to moderately acid in the solum and very strongly acid to neutral in the substratum, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Rapid or very rapid
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 35 percent
- Soils that are less than 65 inches deep over bedrock
- Moderately well drained soils
- Gilpin or Peabody soils

- The Sensabaugh soils that are subject to rare or occasional flooding and are on alluvial fans and narrow flood plains

Nonlimiting inclusions:
- Soils that have slopes of less than 15 percent
- Areas where the surface stones have been removed in order to make agricultural management easier
- Upshur soils

Use and Management

Most areas of this soil are wooded. Some areas have been cleared and are used for pasture.

Cropland
Suitability: Unsuited
Management considerations:
- Operation of conventional farm machinery is difficult because of the slope and the surface stoniness.
- Erosion is a major management concern.
- A suitable alternative site should be selected.

Pasture and Hayland
Suitability: Unsuitable as hayland and difficult to manage for pasture
Management considerations:
- Operation of conventional farm machinery used in clipping and applying fertilizer is difficult because of the slope and the surface stoniness.
- The hazard of erosion, establishing and maintaining a mixture of grasses and legumes, and overgrazing are major management concerns.
- Proper stocking rates, pasture rotation, timely deferment of grazing, restricted use during wet periods, clipping, and weed control help to keep the pasture in good condition.
- Applying lime and fertilizer according to soil test recommendations to meet forage nutrient needs will help reduce the risk of nutrient leaching and ground-water pollution.

Woodland
Potential productivity: Moderately high
Management considerations:
- The major management concerns are the equipment limitation; the hazard of erosion on roads, skid trails, and log landings; plant competition; and, on south aspects, seedling mortality. Erosion is a very severe hazard in harvested areas if poor logging practices are applied.
- Because of the slope, special care is needed in laying out logging roads and landings and in operating logging equipment. Logging roads should be built on the contour or on the gentler slopes, and the grade should be kept as low as possible.
- Logging roads require suitable surfacing for year-round use. Extra stone may be needed in road construction to maintain a stable and uniform road surface. Unsurfaced roads are soft when this soil is wet and can be impassable during rainy periods. Use of wheeled and tracked equipment when the soil is wet causes excessive rutting.
- Because of the erosion hazard, water should be removed from logging roads by water bars, outsloping or insloping road surfaces, culverts, and drop structures. Road cuts and fill slopes are especially susceptible to erosion.
- Seeding logging roads, skid trails, and landings after the trees have been harvested helps to prevent excessive erosion.
- Keeping the total mileage of roads and trails to a minimum helps to control erosion.

- Site preparation following harvest and establishment of the new forest for tree crop production without delay help to control plant competition.
- Applying herbicides to help control competing vegetation, selecting planting stock with a well developed root system, and timing planting to take full advantage of the spring rains help to ensure the successful establishment of a tree plantation.
- Planting nursery stock that is larger than is typical or planting containerized seedlings helps to reduce the seeding mortality rate.

Community Development
Suitability: Limited
Management considerations:
- The slope, the hazard of erosion, the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength are major management concerns.
- Land shaping and grading can help overcome the slope on building sites.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the slope and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: 7s

VuD—Vandalia-Urban land complex, 15 to 25 percent slopes

Setting

Landscape position: Footslopes, mainly in and around West Union and Smithburg

Composition

Vandalia soil: 70 percent
Urban land: 20 percent
Inclusions: 10 percent

Typical Profile

Vandalia
Surface layer:
0 to 6 inches—dark brown silt loam

Subsurface layer:
6 to 10 inches—brown channery silty clay loam

Subsoil:
10 to 17 inches—brown channery silty clay
17 to 24 inches—strong brown silty clay
24 to 33 inches—reddish brown clay
33 to 60 inches—reddish brown silty clay

Substratum:
60 to 65 or more inches—reddish brown channery silty clay

Urban land
No typical profile is given for Urban land. The Urban land consists of areas covered by buildings, streets, parking lots, and other structures.

Soil Properties and Qualities

Drainage class: Well drained
Permeability: Slow
Available water capacity: Moderate or high
Depth to a seasonal high water table: 4 to 6 feet
Hazard of flooding: None
Shrink-swell potential: High
Erosion hazard: Severe
Slope class: Moderately steep
Stoniness: Nonstony
Rockiness: Nonrocky
Natural fertility: Medium
Soil reaction: Very strongly acid to moderately acid in the solum and very strongly acid to neutral in the substratum, except where lime has been applied
Organic matter content in the surface layer: Moderately low or moderate
Surface runoff: Rapid
Depth to bedrock: More than 65 inches
Prime farmland: No

Inclusions

Limiting inclusions:
- Soils that have slopes of more than 25 percent
- Soils that are less than 65 inches deep over bedrock
- Moderately well drained soils
- Gilpin or Peabody soils

Nonlimiting inclusions:
- Soils that have slopes of less than 15 percent
- Upshur soils

Use and Management

This unit is used for urban development.

Garden Areas
Suitability: Limited
Management considerations:
- The hazard of erosion and soil tilth are major management concerns.

- Tilling the soil across the slope, crop residue management, and winter cover crops help to prevent excessive soil loss.
- Crop residue management, green manure crops, applications of animal manure or composted material, cover crops, conservation tillage, and tilling at the proper soil moisture content help to maintain or improve tilth, conserve soil moisture, prevent surface crusting, and increase the available water capacity and organic matter content.
- Following soil test recommendations, timing fertilizer applications to meet crop nutrient needs, using split fertilizer applications, and applying fertilizer in bands may reduce the risk of nutrient runoff, nutrient leaching, and ground-water pollution.

Pasture and Hayland

This unit is unsuitable as pasture and hayland because it is used for urban development.

Woodland

This unit is unsuitable for timber production because it is used for urban development.

Community Development

Suitability: Limited

Management considerations:

- The slope, the hazard of erosion, the shrink-swell potential, the hazard of soil slippage, the slow permeability, and low strength are major management concerns.
- Land shaping and grading can help overcome the slope on building sites.
- Erosion is a hazard in areas cleared for construction, but designing dwellings so that they conform to the natural slope and setting helps to keep land shaping, and thus erosion, to a minimum.
- Establishing a plant cover during or soon after construction helps to control erosion.
- Topsoil should be stockpiled for use in revegetation. Establishing a vegetative cover in areas where the topsoil is stockpiled reduces the hazard of erosion.
- Using extra reinforcement in footers, backfilling with porous material, and keeping water away from foundations and footers with properly designed surface and subsurface drains help to prevent the structural damage caused by shrinking and swelling.
- Keeping surface and subsurface water away from building sites and avoiding unnecessary soil disturbance help to prevent soil slippage on sites for buildings and septic tank absorption fields.
- Oversizing the absorption field, installing the distribution lines on the contour, land shaping, backfilling the trenches with gravel, installing an alternative system, or selecting a better suited soil will help to overcome the slope and the slow permeability on sites for septic tank absorption fields.
- Building roads and streets on the contour or on a gentle grade across the slope helps to overcome the slope.
- Using coarse grained base material, placing a filter fabric between the subgrade and road base, and installing surface drainage ditches and cross culverts for removal of surface water help to prevent the road damage caused by low strength and by shrinking and swelling.

Interpretive Group

Land capability classification: Vandalia—4e; Urban land—unassigned

W—Water

This map unit consists of areas inundated with water for most of the year. It generally includes streams, lakes, and large ponds. No interpretations are given for this map unit.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forestland or for engineering purposes.

In the capability system, soils are generally grouped at two levels—capability class and subclass.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.
Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.
Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.
Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.
Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, forestland, or wildlife habitat.
Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, forestland, or wildlife habitat.
Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.
Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, forestland, wildlife habitat, or recreation.

The acreage of soils in each capability class or subclass is shown in table 6. The capability classification of map units in this survey area is given in the section “Detailed Soil Map Units” and in the yields table.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation’s short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation’s prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pasture, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

The map units in the survey area that are considered prime farmland are listed in table 7. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading “Detailed Soil Map Units.”

Agricultural Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Tables 8a and 8b show the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of these tables, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the tables are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater by irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The soil erodibility factor K and slope are considered in estimating the likelihood that water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The soil erodibility factor K and slope are considered in estimating the likelihood that water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Frozen soils are unsuitable for waste treatment.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a

soil to adsorb heavy metals. Frozen soils are not suitable for disposal of wastewater by irrigation.

Overland flow of wastewater is a process in which wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces, sometimes called terraces, to runoff-collection ditches. The length of the run generally is 150 to 300 feet. The application rate ranges from 2.5 to 16.0 inches per week. It commonly exceeds the rate needed for irrigation of cropland. The wastewater leaves solids and nutrients on the vegetated surfaces as it flows downslope in a thin film. Most of the water reaches the collection ditch, some is lost through evapotranspiration, and a small amount may percolate to the ground water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, and the design and construction of the system. Reaction and the cation-exchange capacity affect absorption. Reaction, salinity, and the sodium adsorption ratio affect plant growth and microbial activity. Slope, permeability, depth to a water table, ponding, flooding, depth to bedrock or a cemented pan, stones, and cobbles affect design and construction. Frozen soils are unsuitable for waste treatment.

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil. The wastewater may eventually reach the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. Depth to a water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance. Frozen soils are unsuitable for waste treatment.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water may percolate to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The soil erodibility factor K and slope are considered in estimating the likelihood of water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Frozen soils are unsuitable for waste treatment.

Forest Productivity and Management

Jeff Mills, service forester, West Virginia Division of Forestry, and Barbara McWhorter, state forester, Natural Resources Conservation Service, helped to prepare this section.

Nearly 180,500 acres in Doddridge County, or about 88 percent of the total acreage, is used as woodland. Individuals own about 97 percent of the woodland,

corporations own about 2.8 percent, and the State owns about 0.2 percent. The wooded areas range from small woodlots on farms to large tracts owned by corporations. According to a survey in 1989, about 90 percent of the woodland in Doddridge County was oak-hickory stands, and the remaining 10 percent was northern hardwoods.

The aspect of some soils, generally those that have slopes of more than 15 percent, affects potential productivity. North aspects face in any compass direction from 315 to 135 degrees. South aspects face in any compass direction from 135 to 315 degrees. Generally, the soils on north aspects are moister and have a higher site index than the soils on south aspects. Aspect also affects the composition of tree species and the severity of the limitations that affect woodland management.

The tables in this section can help forest owners or managers plan the use of soils for wood crops. They show the potential productivity of the soils for wood crops and rate the soils according to the limitations that affect various aspects of forest management.

Forest Productivity

In table 9, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Annual production, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Forest Management

In tables 10a, 10b, and 10c, interpretive ratings are given for various aspects of forest management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified forest management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified forest management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils for forest management practices. More detailed information about the criteria used in the ratings is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service or on the Internet.

For *limitations affecting construction of haul roads and log landings*, the ratings are based on slope, flooding, permafrost, plasticity index, the hazard of soil slippage, content of sand, the Unified classification, rock fragments on or below the surface, depth to a restrictive layer that is indurated, depth to a water table, and ponding. The limitations are described as slight, moderate, or severe. A rating of *slight* indicates that no significant limitations affect construction activities, *moderate* indicates that one or more limitations can cause some difficulty in construction, and *severe* indicates that one or more limitations can make construction very difficult or very costly.

The ratings of *suitability for log landings* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to use as log landings.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of forest equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Ratings in the column *hazard of off-road or off-trail erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *suitability for use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified

classification, depth to a water table, and ponding. The soils are described as well suited, moderately suited, or poorly suited to this use.

Recreation

The old Baltimore and Ohio Railroad line in Doddridge County has been converted to a trail designed for hiking, mountain biking, and horseback riding. The 72-mile North Bend Rail Trail is part of the “Rails to Trails” project. It is currently operated by personnel from North Bend State Park.

The soils of the survey area are rated in tables 11a and 11b according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in tables 11a and 11b can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas.

The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Wildlife Habitat

Casey Shrader, state biologist, and Eugene Friend, soil conservation technician, Natural Resources Conservation Service, helped to prepare this section.

The wildlife habitat in Doddridge County is best suited to woodland wildlife. Almost 88 percent of the acreage in the county is forested. Populations of openland wildlife species, such as bobwhite quail, cottontail rabbit, and meadowlark are in localized areas.

The game species throughout the county include whitetail deer, wild turkey, ruffed grouse, gray squirrel, fox squirrel, and gray fox. Populations of beaver and bobcat are growing throughout the county. Waterfowl and other species that depend on wetland habitat are limited in number and distribution.

The nongame species that inhabit the county include numerous raptors, wood warblers, and other songbirds. Several species of reptiles and amphibians inhabit many areas.

The larger streams in the county support a variety of game fish, including smallmouth bass, largemouth bass, and assorted sunfish. Middle Island Creek and McElroy Creek are well known for producing good-quality muskellunge.

Good management can increase the carrying capacity of wildlife habitat for specific species. Unless major land use changes are made, openland species are not expected to become predominant in the county. Local populations of such species can be increased, however, through careful planning.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, orchardgrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are indiangrass, goldenrod, beggarweed, and wheatgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood

trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, muskrat, mink, and beaver.

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others 1979; U.S. Army Corps of Engineers 1987; National Research Council 1995; Tiner 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands.

The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (Soil Survey Staff 1999) and “Keys to Soil Taxonomy” (Soil Survey Staff 1998) and in the “Soil Survey Manual” (Soil Survey Division Staff 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in “Field Indicators of Hydric Soils in the United States” (Hurt, Whited, and Pringle 1996).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

The following map unit meets the definition of hydric soils and, in addition, has at least one of the hydric soil indicators. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council 1995; Hurt, Whited, and Pringle 1996).

Me Melvin silt loam

Map units that are made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The following map units, in general, do not meet the definition of hydric soils because they do not have one of the hydric soil indicators. A portion of these map units, however, may include hydric soils. Onsite investigation is recommended to determine whether hydric soils occur and the location of the included hydric soils.

Ch Chagrin silt loam
Co Cotaco silt loam
Se Sensabaugh silt loam

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the “Soil Properties” section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 13a and 13b show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost

penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Tables 14a and 14b show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and

the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Tables 15a and 15b give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 15a, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good, fair,* or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the soil is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

The soils are rated *good, fair,* or *poor* as potential sources of topsoil, reclamation material, and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These

properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than

5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 17 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group

index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 18 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In table 18, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In table 18, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 18, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at

$^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 18, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 18 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Chemical Properties

Table 19 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliquivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliquivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Water Features

Table 20 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 20 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most

years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Flooding is the temporary inundation of an area caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 21 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution,

acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff 1998, 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, active, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each

series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff 1998). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

Chagrin Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Landscape position: Nearly level flood plains
Parent material: Alluvium
Slope range: 0 to 3 percent
Classification: Fine-loamy, mixed, active, mesic Dystric Fluventic Eutrudepts

Typical Pedon

Chagrin silt loam, in a hayfield; about 850 feet east-southeast of the confluence of Freds Run and South Fork Hughes River; USGS Oxford topographic quadrangle; lat. 39 degrees 12 minutes 23 seconds N. and long. 80 degrees 50 minutes 24 seconds W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak medium and fine subangular blocky structure parting to moderate medium granular; friable; many medium, fine, and very fine roots; moderately acid; clear wavy boundary.
Bw1—7 to 28 inches; brown (7.5YR 4/4) loam; moderate medium and fine subangular blocky structure; friable; many medium, fine, and very fine and few coarse roots; moderately acid; clear wavy boundary.
Bw2—28 to 42 inches; brown (7.5YR 4/4) loam; weak coarse and medium subangular blocky structure; friable; common medium, fine, and very fine roots; moderately acid; gradual wavy boundary.
C1—42 to 50 inches; brown (7.5YR 4/4) loam; massive; friable; slightly acid; clear wavy boundary.
C2—50 to 65 or more inches; mixed brown (7.5YR 4/4), strong brown (7.5YR 4/6), and grayish brown (10YR 5/2), stratified channery sandy loam and loam; massive; friable; 15 percent rock fragments; neutral.

Range in Characteristics

Thickness of the solum: 30 to 42 inches
Depth to bedrock: More than 65 inches
Reaction: Moderately acid to neutral
Content of rock fragments: 0 percent, by volume, in the solum and 0 to 15 percent, by volume, in the C horizon

Ap horizon:
Hue—7.5YR or 10YR
Value—4
Chroma—2 or 3

Bw horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—loam, silt loam, or sandy loam

C horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—2 to 6
Texture—loam, silt loam, or sandy loam

Cotaco Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate
Landscape position: High flood plains, mainly along the major streams
Parent material: Loamy sediments derived from acid sandstone, siltstone, and shale
Slope range: 0 to 3 percent
Classification: Fine-loamy, mixed, semiactive, mesic Aquic Hapludults

Typical Pedon

Cotaco silt loam, in a hayfield/pasture; about 3,300 feet southeast of the confluence of Lick Run and Meathouse Fork; USGS Smithburg topographic quadrangle; lat. 39 degrees 15 minutes 07 seconds N. and long. 80 degrees 42 minutes 07 seconds W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; moderate medium and fine subangular blocky structure parting to moderate medium granular; very friable, nonsticky, nonplastic; many medium, fine, and very fine roots; slightly acid; clear smooth boundary.

BA—7 to 12 inches; brown (10YR 5/3) silt loam; moderate medium subangular blocky structure; friable, nonsticky, nonplastic; common fine and very fine roots; common fine iron and manganese concretions; slightly acid; clear wavy boundary.

Bt1—12 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; moderate coarse and medium subangular blocky structure; friable, sticky, plastic; few fine and very fine roots; common discontinuous clay films; common medium and fine iron and manganese concretions; few fine strong brown (7.5YR 5/6) redoximorphic concentrations in the matrix; slightly acid; gradual wavy boundary.

Bt2—18 to 31 inches; pale brown (10YR 6/3) silty clay loam; moderate coarse and medium subangular blocky structure; friable, sticky, plastic; few fine and very fine roots; common discontinuous clay films; common medium and fine iron and manganese concretions; many medium and fine light gray (10YR 7/2) redoximorphic depletions and strong brown (7.5YR 5/6) redoximorphic concentrations in the matrix; strongly acid; gradual wavy boundary.

Bt3—31 to 42 inches; pale brown (10YR 6/3) silty clay loam; weak coarse and medium subangular blocky structure; friable, sticky, plastic; few fine and very fine roots; few discontinuous clay films; many very coarse, coarse, and medium iron and manganese concretions; many medium and fine light gray (10YR 7/2) redoximorphic depletions and strong brown (7.5YR 5/6) redoximorphic concentrations in the matrix; strongly acid; gradual wavy boundary.

C—42 to 65 or more inches; strong brown (7.5YR 4/6) silty clay loam; massive; friable, sticky, plastic; many very coarse, coarse, and medium iron and manganese concretions; common medium light gray (10YR 7/2) redoximorphic depletions in the matrix; strongly acid.

Range in Characteristics

Thickness of the solum: 30 to 60 inches
Depth to bedrock: More than 65 inches

Reaction: Extremely acid to slightly acid
Content of rock fragments: 0 to 5 percent, by volume, in the A and BA horizons and 0 to 10 percent, by volume, in the Bt and C horizons

Ap horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—3 or 4

BA horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 to 6
Texture—silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—3 to 6
Texture—silty clay loam, silt loam, or clay loam

C horizon:
Hue—7.5YR, 10YR, or gleyed
Value—4 to 7
Chroma—1 to 6
Texture—silty clay loam or silt loam

Gallia Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape position: High stream terraces along Middle Island Creek
Parent material: Old alluvium
Slope range: 8 to 15 percent
Classification: Fine-loamy, siliceous, active, mesic Typic Paleudalfs

Typical Pedon

Gallia silt loam, 8 to 15 percent slopes, in a pasture; in Pleasants County; about 660 feet south of Middle Island Creek, about 0.5 mile east of the Pleasants-Tyler County line; USGS Bens Run topographic quadrangle; lat. 39 degrees 27 minutes 44 seconds N. and long. 81 degrees 01 minute 06 seconds W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; friable; many fine roots; slightly acid; clear smooth boundary.
BA—7 to 13 inches; strong brown (7.5YR 4/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; strongly acid; clear wavy boundary.
Bt1—13 to 26 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; strongly acid; clear wavy boundary.
Bt2—26 to 51 inches; reddish brown (5YR 4/4) clay loam; weak very coarse prismatic structure parting to strong coarse and medium subangular blocky; firm; plastic; few fine roots; common distinct clay films on faces of peds; few medium and fine iron and manganese concretions; very strongly acid; clear wavy boundary.
Bt3—51 to 65 or more inches; strong brown (7.5YR 5/6) clay loam; weak very coarse prismatic structure parting to weak coarse subangular blocky; friable; common

distinct clay films on faces of peds; few medium and fine iron and manganese concretions; very strongly acid.

Range in Characteristics

Thickness of the solum: 60 to 80 inches
Depth to bedrock: More than 65 inches
Reaction: Very strongly acid to slightly acid in the A and BA horizons and very strongly acid or strongly acid in the Bt horizon
Content of rock fragments: 0 percent, by volume, in the solum

Ap horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—3 or 4

BA horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—loam or silt loam

Bt horizon:
Hue—5YR or 7.5YR
Value—4 or 5
Chroma—6 to 8
Texture—loam or clay loam

Gilpin Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Landscape position: Ridges, benches, and side slopes
Parent material: Siltstone and shale
Slope range: 8 to 70 percent
Classification: Fine-loamy, mixed, semiactive, mesic Typic Hapludults

Typical Pedon

Gilpin silt loam, in an area of Gilpin-Peabody complex, 35 to 70 percent slopes, very stony, on a wooded side slope; about 1,200 feet north-northwest of the confluence of Fallen Timber Run and Cove Creek; USGS Vadis topographic quadrangle; lat. 39 degrees 06 minutes 17 seconds N. and long. 80 degrees 44 minutes 53 seconds W.

A—0 to 3 inches; brown (10YR 4/3) silt loam; moderate medium, fine, and very fine granular structure; very friable; many fine and very fine and few medium roots; 10 percent rock fragments; strongly acid; clear wavy boundary.
Bt1—3 to 10 inches; brownish yellow (10YR 6/6) silt loam; weak medium and fine subangular blocky structure; friable; common medium, fine, and very fine roots; few discontinuous clay films on faces of peds; 10 percent rock fragments; very strongly acid; gradual wavy boundary.
Bt2—10 to 23 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable; common fine and very fine and few medium roots; common discontinuous clay films on faces of peds; 25 percent rock fragments; very strongly acid; gradual wavy boundary.

Bt3—23 to 33 inches; yellowish brown (10YR 5/6) very channery silt loam; weak medium subangular blocky structure; friable; few fine and very fine roots; few discontinuous clay films on faces of peds; 40 percent rock fragments; very strongly acid; abrupt wavy boundary.
R—33 inches; siltstone.

Range in Characteristics

Thickness of the solum: 19 to 35 inches
Depth to bedrock: 20 to 40 inches
Reaction: Very strongly acid or strongly acid
Content of rock fragments: 5 to 15 percent, by volume, in the A horizon; 5 to 15 percent, by volume, in the BA horizon (if it occurs); 5 to 40 percent, by volume, in the Bt horizon; 5 to 40 percent, by volume, in the BC horizon (if it occurs); and 30 to 80 percent, by volume, in the C horizon (if it occurs)

A horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 to 4

BA horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—3 or 4
Texture—silt loam or loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6
Chroma—4 to 6
Texture—silty clay loam, silt loam, or loam

BC horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—silty clay loam or silt loam

C horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam, silty clay loam, or loam

Hackers Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Landscape position: High flood plains along Middle Island Creek
Parent material: Alluvium derived from interbedded shale, siltstone, and some sandstone
Slope range: 0 to 3 percent
Classification: Fine-silty, mixed, active, mesic Typic Hapludalfs

Typical Pedon

Hackers silt loam, 3 to 8 percent slopes, in a meadow; in Tyler County; between Middle Island Creek and West Virginia Route 18, about 0.5 mile southeast of Middlebourne; USGS Middlebourne topographic quadrangle; lat. 39 degrees 28 minutes 56 seconds N. and long. 80 degrees 53 minutes 50 seconds W.

Ap—0 to 8 inches; brown (7.5YR 4/4) silt loam; moderate medium granular structure; friable; many fine and very fine roots; strongly acid; abrupt smooth boundary.

Bt1—8 to 22 inches; reddish brown (5YR 4/4) silty clay loam; moderate coarse and medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—22 to 38 inches; reddish brown (5YR 4/4) silty clay loam; strong coarse and medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—38 to 44 inches; yellowish red (5YR 4/6) silt loam; moderate coarse and medium subangular blocky structure; firm; few fine roots; few distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

C—44 to 65 or more inches; reddish brown (5YR 4/4) silt loam; common medium light reddish brown (5YR 6/3) mottles; massive; friable; moderately acid.

Range in Characteristics

Thickness of the solum: 30 to 50 inches
Depth to bedrock: More than 65 inches
Reaction: Strongly acid or moderately acid
Content of rock fragments: 0 to 5 percent, by volume, in the individual horizons

Ap horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—3 or 4

BA horizon (if it occurs):
Hue—7.5YR
Value—3 or 4
Chroma—3 or 4
Texture—silt loam

Bt horizon:
Hue—5YR or 7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam or silty clay loam

C horizon:
Hue—5YR
Value—3 or 4
Chroma—3 or 4
Texture—silt loam

Kanawha Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate

Landscape position: High flood plains, mainly along the major streams
Parent material: Alluvium derived from interbedded shale, siltstone, and sandstone
Slope range: 0 to 3 percent
Classification: Fine-loamy, mixed, active, mesic Typic Hapludalfs

Typical Pedon

Kanawha loam, in a hayfield/pasture; about 1,600 feet south-southeast from the entrance to Doddridge County Park; USGS Smithburg topographic quadrangle; lat. 39 degrees 16 minutes 05 seconds N. and long. 80 degrees 43 minutes 49 seconds W.

Ap1—0 to 4 inches; dark brown (10YR 3/3) loam; moderate medium and fine granular structure; very friable; many medium, fine, and very fine roots; neutral; abrupt smooth boundary.
Ap2—4 to 9 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure parting to moderate coarse and medium granular; very friable; common fine and very fine roots; neutral; abrupt smooth boundary.
BA—9 to 14 inches; dark yellowish brown (10YR 4/4) loam; weak coarse and medium subangular blocky structure; friable; common fine and very fine roots; slightly acid; clear wavy boundary.
Bt1—14 to 24 inches; brown (7.5YR 5/4) loam; moderate coarse and medium subangular blocky structure; friable; few fine and very fine roots; many discontinuous clay films on faces of peds; moderately acid; clear wavy boundary.
Bt2—24 to 40 inches; brown (7.5YR 5/4) clay loam; moderate coarse and medium subangular blocky structure; friable; few fine and very fine roots; many discontinuous clay films on faces of peds; moderately acid; gradual wavy boundary.
Bt3—40 to 54 inches; brown (7.5YR 5/4) loam; weak medium subangular blocky structure; friable; few discontinuous clay films on faces of peds; moderately acid; gradual wavy boundary.
BC—54 to 65 or more inches; brown (7.5YR 5/4) loam; weak fine subangular blocky structure parting to weak coarse platy; friable; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to 72 inches
Depth to bedrock: More than 65 inches
Reaction: Strongly acid to neutral in the A and BA horizons and in the upper part of the Bt horizon and moderately acid to neutral in the lower part of the Bt horizon, in the B horizon, and in the C horizon (if it occurs)
Content of rock fragments: 0 percent, by volume, in the solum and substratum

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—3

BA horizon:
Hue—7.5YR or 10YR
Value—4
Chroma—4 to 6
Texture—loam or silt loam

Bt horizon:
Hue—7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—loam, silt loam, or clay loam

BC horizon:
Hue—7.5YR
Value—5
Chroma—4
Texture—loam

C horizon (if it occurs):
Hue—7.5YR
Value—5
Chroma—4
Texture—loam

Melvin Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Landscape position: High flood plains
Parent material: Mixed, medium textured alluvium
Slope range: 0 to 3 percent
Classification: Fine-silty, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts

Typical Pedon

Melvin silt loam, in an idle field; in Pleasants County; 20 feet west of West Virginia Route 2, between Eagle Run and Riggs Run near Raven Rock; USGS Bens Run topographic quadrangle; lat. 39 degrees 26 minutes 55 seconds N. and long. 81 degrees 07 minutes 19 seconds W.

Ap1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium and fine granular structure; friable; common fine roots; few fine dark gray (10YR 4/1) redoximorphic depletions; neutral; abrupt smooth boundary.

Ap2—4 to 9 inches; brown (10YR 4/3) silt loam; moderate coarse and medium subangular blocky structure parting to weak medium granular; friable; common fine roots; common medium and fine dark gray (10YR 4/1) redoximorphic depletions and yellowish brown (10YR 5/6) redoximorphic concentrations; neutral; clear smooth boundary.

Bg—9 to 36 inches; light brownish gray (10YR 6/2) silt loam; weak medium and fine subangular blocky structure; friable; common medium gray (10YR 6/1) redoximorphic depletions and strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid; gradual wavy boundary.

Cg—36 to 65 or more inches; grayish brown (10YR 5/2) silt loam; massive; friable; common coarse and medium gray (10YR 6/1) redoximorphic depletions and strong brown (7.5YR 5/6) redoximorphic concentrations; slightly acid.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: More than 65 inches
Reaction: Moderately acid to neutral
Content of rock fragments: 0 to 5 percent, by volume, in the A and Bg horizons and 0 to 20 percent, by volume, in the C horizon

Ap horizon:
Hue—10YR
Value—4 to 6
Chroma—1 to 3

Bg horizon:
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silt loam or silty clay loam

Cg horizon:
Hue—10YR
Value—4 to 6
Chroma—1 or 2
Texture—silty clay loam or silt loam

Monongahela Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow in the fragipan
Landscape position: High stream terraces, mainly along Middle Island Creek, Meathouse Fork, and McElroy Creek
Parent material: Old alluvium derived from acid sandstone and shale
Slope range: 3 to 15 percent
Classification: Fine-loamy, mixed, semiactive, mesic Typic Fragiudults

Typical Pedon

Monongahela silt loam, 3 to 8 percent slopes, in a hayfield/pasture; about 1,200 feet southwest of the confluence of Slaughter Run and Middle Island Creek; USGS West Union topographic quadrangle; lat. 39 degrees 19 minutes 58 seconds N. and long. 80 degrees 48 minutes 45 seconds W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure parting to moderate coarse and medium granular; very friable; many coarse, medium, and fine roots; neutral; abrupt smooth boundary.

BA—8 to 12 inches; dark yellowish brown (10YR 4/6) silt loam; weak medium subangular blocky structure; friable; common medium and fine roots; slightly acid; clear wavy boundary.

Bt—12 to 22 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common medium and fine roots; common discontinuous clay films on faces of peds; slightly acid; clear wavy boundary.

Btx1—22 to 33 inches; yellowish brown (10YR 5/6) silt loam; moderate very coarse and coarse prismatic structure parting to weak coarse platy; very firm; few very fine roots between prism faces; common discontinuous clay films on faces of peds; common medium and fine iron and manganese coatings; common medium and fine distinct light brownish gray (10YR 6/2) redoximorphic depletions in the matrix; strongly acid; gradual wavy boundary.

Btx2—33 to 51 inches; yellowish brown (10YR 5/6) clay loam; weak very coarse and coarse prismatic structure parting to weak coarse platy; very firm; common discontinuous clay films on faces of peds; common medium and fine iron and manganese coatings; many coarse and medium distinct light gray (10YR 7/2) redoximorphic depletions in the matrix; strongly acid; gradual wavy boundary.

BC—51 to 65 or more inches; yellowish red (5YR 4/6) channery clay loam; weak very coarse and coarse prismatic structure; firm; common coarse and medium distinct

light brownish gray (10YR 6/2) redoximorphic depletions in the matrix; 15 percent weathered shale fragments; very strongly acid.

Range in Characteristics

Thickness of the solum: 40 to 72 inches
Depth to bedrock: More than 65 inches
Reaction: Strongly acid to neutral
Content of rock fragments: 0 percent, by volume, above and within the fragipan and 0 to 20 percent, by volume, below the fragipan

Ap horizon:
Hue—10YR
Value—3 or 4
Chroma—3

BA horizon:
Hue—10YR
Value—4
Chroma—4 to 6
Texture—silt loam

Bt horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—6
Texture—silty clay loam, loam, clay loam, or silt loam

Btx horizon:
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—6
Texture—clay loam, loam, or silt loam

BC horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—6
Texture—clay loam or loam

Peabody Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Landscape position: Ridges, benches, and side slopes
Parent material: Interbedded olive yellow siltstone and red clay shales
Slope range: 25 to 70 percent
Classification: Fine, mixed, active, mesic Ultic Hapludalfs

Typical Pedon

Peabody silt loam, in an area of Gilpin-Peabody complex, 35 to 70 percent slopes, very stony, on a wooded side slope; about 2,500 feet south of the intersection of U.S. Route 50 and West Virginia Route 18; USGS West Union topographic quadrangle; lat. 39 degrees 16 minutes 51 seconds N. and long. 80 degrees 46 minutes 07 seconds W.

Oi—0 to 1 inch; slightly decomposed leaf litter.

A—1 to 3 inches; brown (10YR 4/3) silt loam; moderate medium and fine granular structure; very friable; many medium, fine, and very fine roots; strongly acid; abrupt smooth boundary.

Bt1—3 to 7 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium and fine subangular blocky structure; friable, sticky, plastic; common medium, fine, and very fine roots; common discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—7 to 21 inches; reddish brown (2.5YR 4/4) clay; moderate medium subangular blocky structure; firm, very sticky, very plastic; common medium, fine, and very fine roots; many continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

BC—21 to 27 inches; reddish brown (2.5YR 4/4) very channery silty clay; weak medium subangular blocky structure; friable, very sticky, very plastic; few medium, fine, and very fine roots; 40 percent rock fragments; very strongly acid; clear wavy boundary.

Cr—27 to 33 inches; pale olive (5Y 6/4), soft, weathered mudstone.

R—33 inches; reddish brown (2.5YR 4/4), hard siltstone.

Range in Characteristics

Thickness of the solum: 23 to 40 inches

Depth to bedrock: 20 to 40 inches

Reaction: Very strongly acid to slightly acid in the solum and strongly acid or moderately acid in the substratum

Content of rock fragments: 0 to 15 percent, by volume, in the A horizon, BA horizon (if it occurs), and upper part of the Bt horizon; 0 to 20 percent, by volume, in the lower part of the Bt horizon; and 15 to 45 percent, by volume, in the BC horizon and C horizon (if it occurs)

A horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 to 4

BA horizon (if it occurs):
Hue—7.5YR or 10YR
Value—4 or 5
Chroma—4 to 6
Texture—silt loam or silty clay loam

Bt horizon:
Hue—2.5YR or 5YR
Value—3 or 4
Chroma—4 to 6
Texture—silty clay loam, clay, or silty clay

BC horizon:
Hue—2.5YR or 5YR
Value—3 or 4
Chroma—4 to 6
Texture—clay, silty clay loam, or silty clay

C horizon (if it occurs):
Hue—2.5YR or 5YR
Value—3 or 4
Chroma—3 to 6
Texture—silty clay loam, clay, or silty clay

Sensabaugh Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Landscape position: Along small streams and drainageways and on alluvial fans
Parent material: Alluvial or colluvial material
Slope range: 0 to 8 percent
Classification: Fine-loamy, mixed, semiactive, mesic Dystric Fluventic Eutrudepts

Typical Pedon

Sensabaugh silt loam, in a hayfield/pasture; about 2.3 miles southeast of the confluence of the Left Fork and Right Fork of Arnold Creek; USGS Oxford topographic quadrangle; lat. 39 degrees 14 minutes 32 seconds N. and long. 80 degrees 47 minutes 10 seconds W.

Ap—0 to 6 inches; brown (7.5YR 4/3) silt loam; moderate coarse and medium granular structure; friable; many fine and very fine roots; slightly acid; clear wavy boundary.

Bw1—6 to 19 inches; brown (7.5YR 4/4) silt loam; moderate coarse and medium subangular blocky structure; friable; common fine and very fine roots; 5 percent rock fragments; slightly acid; clear wavy boundary.

Bw2—19 to 25 inches; brown (7.5YR 4/4) loam; weak coarse and medium subangular blocky structure; friable; common fine and very fine roots; 5 percent rock fragments; slightly acid; clear wavy boundary.

BC—25 to 30 inches; brown (7.5YR 4/4) channery loam; weak coarse subangular blocky structure; friable; few fine and very fine roots; 20 percent rock fragments; few fine faint brown (7.5YR 5/2) redoximorphic depletions and strong brown (7.5YR 5/6) redoximorphic concentrations in the matrix; slightly acid; clear wavy boundary.

C1—30 to 39 inches; dark yellowish brown (10YR 4/4) very channery sandy loam; massive; very friable; 35 percent rock fragments; slightly acid; clear wavy boundary.

C2—39 to 49 inches; dark yellowish brown (10YR 4/4) extremely channery sandy loam; massive; very friable; 60 percent rock fragments; slightly acid; clear wavy boundary.

C3—49 to 65 or more inches; dark yellowish brown (10YR 4/4) channery sandy loam; massive; very friable; 15 percent rock fragments; common medium prominent greenish gray (5G 6/1), pale green (5G 6/2), and reddish brown (5YR 4/3) redoximorphic depletions and olive (5Y 5/6) redoximorphic concentrations in the matrix; neutral.

Range in Characteristics

Thickness of the solum: 24 to 42 inches
Depth to bedrock: More than 65 inches
Reaction: Moderately acid to neutral
Content of rock fragments: 0 to 10 percent, by volume, in the Ap horizon; 5 to 40 percent, by volume, in the B and BC horizons; and 15 to 65 percent, by volume, in the C horizon

A horizon:
Hue—5YR to 10YR
Value—3 or 4
Chroma—3 or 4

Bw horizon:
Hue—5YR to 10YR

Value—4 or 5
Chroma—3 to 6
Texture—silt loam, loam, sandy loam, or silty clay loam

BC horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—4
Texture—loam, silt loam, or sandy loam

C horizon:
Hue—5YR to 10YR
Value—4 or 5
Chroma—3 to 6
Texture—sandy loam, loam, or silt loam

Udorthents

Depth class: Varies
Drainage class: Varies
Permeability: Varies
Landscape position: Mainly along U.S. Route 50 in areas radically disturbed by construction
Parent material: Sandstone, siltstone, and shale
Slope range: 0 to 70 percent
Classification: Udorthents

Typical Pedon

These soils vary so much that a typical pedon cannot be described.

Range in Characteristics

Thickness of the solum: Varies
Depth to bedrock: Varies
Reaction: Varies
Content of rock fragments: Varies

Upshur Series

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Landscape position: Ridges, benches, and hillsides
Parent material: Residuum derived from clay shale interbedded with siltstone
Slope range: 8 to 25 percent
Classification: Fine, mixed, superactive, mesic Typic Hapludalfs

Typical Pedon

Upshur silt loam, in an area of Gilpin-Upshur complex, 15 to 25 percent slopes, used as pasture; about 4,500 feet southeast of the confluence of Wolfpen Run and Nutter Fork; USGS West Union topographic quadrangle; lat. 39 degrees 19 minutes 35 seconds N. and long. 80 degrees 46 minutes 20 seconds W.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; very friable; many fine and very fine and few coarse roots; moderately acid; abrupt wavy boundary.

BA—2 to 6 inches; brown (7.5YR 4/4) silt loam; moderate medium and fine subangular blocky structure; friable; common medium, fine, and very fine roots; moderately acid; clear wavy boundary.
Bt1—6 to 11 inches; reddish brown (5YR 4/4) silty clay; moderate medium subangular blocky structure; friable, sticky, plastic; few coarse, medium, fine, and very fine roots; common discontinuous clay films on faces of peds; strongly acid; clear wavy boundary.
Bt2—11 to 20 inches; dark reddish brown (2.5YR 3/4) clay; strong medium and fine subangular blocky structure; friable, very sticky, very plastic; few medium, fine, and very fine roots; many discontinuous clay films on faces of peds; very strongly acid; clear wavy boundary.
Bt3—20 to 35 inches; reddish brown (2.5YR 4/4) clay; moderate medium subangular blocky structure; firm, very sticky, very plastic; few medium, fine, and very fine roots; common discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.
BC—35 to 46 inches; dusky red (10R 3/4) clay; weak medium subangular blocky structure; friable, very sticky, very plastic; few fine and very fine roots; few discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.
C—46 to 57 inches; dusky red (10R 3/4) silty clay loam; massive; friable, sticky, plastic; 10 percent rock fragments; moderately acid; clear wavy boundary.
Cr—57 inches; pale olive (5Y 6/3), soft siltstone.

Range in Characteristics

Thickness of the solum: 26 to 50 inches
Depth to bedrock: 40 to 60 inches
Reaction: Very strongly acid to slightly acid in the A and BA horizons and very strongly acid to moderately acid in the Bt, BC, and C horizons
Content of rock fragments: 0 to 10 percent, by volume, throughout the profile

A horizon:
Hue—7.5YR or 10YR
Value—3 or 4
Chroma—2 to 4

BA horizon:
Hue—5YR or 7.5YR
Value—4
Chroma—4 to 6
Texture—silt loam

Bt horizon:
Hue—2.5YR or 5YR
Value—3 or 4
Chroma—4 to 6
Texture—clay or silty clay

BC horizon:
Hue—10R to 5YR
Value—3 or 4
Chroma—3 to 6
Texture—silty clay loam, silty clay, or clay

C horizon:
Hue—10R to 5YR
Value—3 or 4
Chroma—3 to 6
Texture—silty clay, silty clay loam, or clay

Vandalia Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Landscape position: Footslopes
Parent material: Colluvium derived from shale, siltstone, and some sandstone
Slope range: 8 to 35 percent
Classification: Fine, mixed, active, mesic Typic Hapludalfs

Typical Pedon

Vandalia silt loam, 15 to 25 percent slopes, in an idle field; about 1,100 feet north-northeast of the confluence of Big Run and South Fork Hughes River; USGS Oxford topographic quadrangle; lat. 39 degrees 11 minutes 53 seconds N. and long. 80 degrees 48 minutes 15 seconds W.

Ap—0 to 6 inches; dark brown (7.5YR 3/3) silt loam; weak medium subangular blocky structure parting to moderate medium and fine granular; friable, slightly sticky, slightly plastic; many medium, fine, and very fine roots; 5 percent rock fragments; moderately acid; clear wavy boundary.

BA—6 to 10 inches; brown (7.5YR 4/4) channery silty clay loam; moderate medium and fine subangular blocky structure; friable, slightly sticky, plastic; many medium, fine, and very fine roots; 15 percent rock fragments; moderately acid; clear wavy boundary.

Bt1—10 to 17 inches; brown (7.5YR 4/4) channery silty clay; moderate coarse and medium subangular blocky structure; friable, sticky, plastic; common fine and very fine roots; common discontinuous clay films on faces of peds; 20 percent rock fragments; moderately acid; clear wavy boundary.

Bt2—17 to 24 inches; strong brown (7.5YR 4/6) silty clay; moderate coarse and medium subangular blocky structure; friable, sticky, plastic; few fine and very fine roots; many discontinuous clay films in pores and on faces of peds; 5 percent rock fragments; moderately acid; clear wavy boundary.

Bt3—24 to 33 inches; reddish brown (5YR 4/4) clay; moderate medium subangular blocky structure; friable, sticky, plastic; few very fine roots; many continuous clay films in pores and on faces of peds; 5 percent rock fragments; moderately acid; clear wavy boundary.

Bt4—33 to 60 inches; reddish brown (5YR 4/4) silty clay; weak coarse and medium subangular blocky structure; friable, sticky, plastic; few very fine roots; many discontinuous clay films in pores and on faces of peds; 5 percent rock fragments; moderately acid; clear wavy boundary.

C—60 to 65 or more inches; reddish brown (2.5YR 4/3) channery silty clay; massive; friable, sticky, plastic; 25 percent rock fragments; slightly acid.

Range in Characteristics

Thickness of the solum: 50 to 65 inches
Depth to bedrock: More than 65 inches
Reaction: Very strongly acid to moderately acid in the solum and very strongly acid to neutral in the substratum
Content of rock fragments: 5 to 10 percent, by volume, in the Ap horizon; 5 to 15 percent, by volume, in the BA horizon; 5 to 30 percent, by volume, in the B horizon; and 10 to 40 percent, by volume, in the C horizon

Ap horizon:
Hue—5YR to 10YR
Value—3 or 4
Chroma—3 or 4

BA horizon:
Hue—5YR or 7.5YR
Value—3 to 5
Chroma—4 to 6
Texture—silt loam or silty clay loam

Bt horizon:
Hue—5YR or 7.5YR
Value—4 or 5
Chroma—4 to 6
Texture—silty clay loam, clay, silt loam, or silty clay

C horizon:
Hue—2.5YR or 5YR
Value—3 or 4
Chroma—3 to 6
Texture—clay or silty clay

Formation of the Soils

The origin and development of the soils in Doddridge County are explained in this section. The five major factors of soil formation are identified, and their influence on the soils in the county is described.

Factors of Soil Formation

The soils in Doddridge County formed as a result of the interaction of the five major factors of soil formation—parent material, time, climate, living organisms, and topography. Each factor modifies the effect of the others. Parent material, topography, and time have resulted in the major differences among the soils in the county. Climate and living organisms generally influence soil formation throughout broad areas.

Parent Material, Time, and Climate

The character of the parent material strongly influences the time required for soil formation and the nature of the soil that forms. The soils in Doddridge County formed in residuum, colluvium, or alluvium. Most of the soils formed in material weathered from rocks of the Dunkard Group; however, some soils formed in material from the Monongahela Group. Examples are the Gilpin soils, which formed in material weathered from shale, siltstone, and sandstone, and the Peabody soils, which formed in material weathered from siltstone and red clay shale.

The residuum is the oldest parent material in the county. Clayey material, resistant rock, the slope, and constant erosion have retarded soil formation. Consequently, the profile of some of the soils formed in residuum is less well developed than that of some of the soils formed in younger material.

The colluvium is along footslopes and at the head of some drainageways. It is acid and limy soil material that moved downslope. Vandalia soils formed in colluvium. They are lower on the landscape than the Gilpin and Peabody soils.

The parent material on terraces and flood plains was washed from areas of acid and limy soils on uplands. The soil-forming processes have had considerable time to act on the material on terraces. Many additions, losses, and alterations have taken place. The resulting Monongahela and Gallia soils have a moderately well developed profile.

The alluvium on flood plains is the youngest parent material in the county. Most of this material is well suited to soil formation, but the soil-forming processes have had little time to act. The soils on the flood plains generally have a weakly developed profile. Chagrin and Sensabaugh soils are examples.

Climate generally is relatively uniform throughout the county. As a result, it is not responsible for any major differences among soils in the county; however, it is a major factor in the development of soil horizons. A detailed description of the climate is given in the section “General Nature of the County.”

Living Organisms

Living organisms, including plants, animals, bacteria, and fungi, affect soil formation. The kind and amount of vegetation are generally responsible for the content of the organic matter and the color of the surface layer and are partly responsible for

the content of nutrients. Earthworms and burrowing animals help to keep the soil open and porous. They mix organic material with mineral material by moving soil to the surface. Bacteria and fungi decompose organic matter, thus releasing plant nutrients. They somewhat influence the weathering and decomposition of minerals.

Topography

Topography affects soil formation though its effect on the amount of water moving through the soil, the amount and rate of runoff, and the rate of erosion. Large amounts of water have moved through gently sloping and strongly sloping soils. This movement favors the formation of deep soils that have a moderately well developed or well developed profile. On steep and very steep hillsides, less water moves through the soil and more water runs off the surface. The soil material is washed away almost as rapidly as the soil forms. As a result, the soils on many of the steeper hillsides are shallower over bedrock than the soils on the more gentle slopes. The topography in Doddridge County favors the formation of soils on flood plains and terraces, and formation is progressing at a rapid rate. The soils on flood plains are weakly developed, however, mainly because too little time has elapsed since the parent material was deposited.

Morphology of the Soils

The results of soil-forming processes are evident in the different layers, or horizons, in the soil profile. The profile extends from the surface downward to material that has been little changed by the soil-forming processes. Most soils have three major horizons, called A, B, and C horizons. Subdivisions of these horizons are indicated by numbers and lowercase letters in the horizon designation.

The A horizon is the surface layer. It is the layer that has the maximum accumulation of organic matter.

The B horizon underlies the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay, iron, aluminum, or other compounds leached from the surface layer. It commonly has blocky structure and generally is firmer and lighter in color than the A horizon.

The C horizon is below the A and B horizons. It consists of material modified by weathering but is little altered by the soil-forming factors.

Many processes have influenced the formation of horizons in the soils of Doddridge County. The more important of these are the accumulation of organic matter, the reduction and transfer of iron, the formation and translocation of clay minerals, and the formation of soil structure. These processes are continuous and have been taking place for thousands of years.

In most of the soils on uplands in the county, the B horizon is yellowish brown, reddish brown, or dark reddish brown, mainly because of iron oxides. It has blocky structure and translocated clay minerals.

A fragipan has formed in the B horizon of the moderately well drained Monongahela soils on terraces. This slowly permeable or very slowly permeable layer is dense and brittle and is mottled. Most fragipans are grayish or are mottled with gray.

Moderately well drained to poorly drained soils commonly have gray colors. These colors are the result of gleying, or the reduction of iron, during soil formation.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Aspect. The direction in which a slope faces.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	less than 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	more than 5.2

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Bajada. A broad alluvial slope extending from the base of a mountain range out into a basin and formed by coalescence of separate alluvial fans.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte. An isolated small mountain or hill with steep or precipitous sides and a top variously flat, rounded, or pointed that may be a residual mass isolated by erosion or an exposed volcanic neck.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing.

To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds directly beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliquivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque. A semicircular, concave, bowllike area that has steep faces primarily resulting from glacial ice and snow abrasion.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coppice dune. A small dune of fine grained soil material stabilized around shrubs or small trees.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cuesta. A hill or ridge that has a gentle slope on one side and a steep slope on the other; specifically, an asymmetric, homoclinal ridge capped by resistant rock layers of slight or moderate dip.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is nearly flat and fan shaped; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to bedrock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. On a desert surface, a layer of gravel or larger fragments that was emplaced by upward movement of the underlying sediments or that remains after finer particles have been removed by running water or the wind.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water

regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind or proportion of species, or both, or in total production.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Esker. A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the Earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal

grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Head out. To form a flower head.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the Earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 3 percent
Gently sloping	3 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 35 percent
Very steep	35 to 70 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the Earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the Earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at West Union, West Virginia)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snow-fall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January--	39.2	17.8	28.5	70	-14	31	3.13	1.81	4.30	8	8.2
February-	42.7	18.4	30.6	73	-8	46	2.78	1.57	3.86	7	6.1
March----	54.5	28.7	41.6	83	6	164	3.84	2.79	4.81	8	1.5
April----	63.8	36.6	50.2	87	19	326	4.02	2.59	5.33	9	.5
May------	73.1	45.9	59.5	89	27	606	4.94	3.37	6.38	9	.0
June-----	80.6	55.5	68.1	93	38	842	4.45	2.28	6.34	8	.0
July-----	84.1	60.6	72.3	95	45	981	5.10	3.67	6.43	9	.0
August---	83.5	60.2	71.8	96	46	968	4.47	2.69	6.07	7	.0
September	77.1	52.8	65.0	91	34	745	3.68	1.95	5.20	6	.0
October--	65.6	39.4	52.5	83	20	395	3.40	2.05	4.61	7	.0
November-	55.5	30.4	43.0	80	13	170	3.31	2.05	4.45	7	0.7
December-	44.5	23.2	33.8	71	-4	63	3.70	2.18	5.06	8	2.7
Yearly:											
Average-	63.7	39.1	51.4	---	---	---	---	---	---	---	---
Extreme-	---	---	---	98	-16	---	---	---	---	---	---
Total---	---	---	---	---	---	5,337	46.83	25.75	57.09	93	19.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at West Union, West Virginia)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 22	May 10	May 23
2 years in 10 later than--	Apr. 19	May 6	May 18
5 years in 10 later than--	Apr. 11	Apr. 26	May 8
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 16	Oct. 5	Sept. 24
2 years in 10 earlier than--	Oct. 21	Oct. 11	Sept. 29
5 years in 10 earlier than--	Oct. 29	Oct. 22	Oct. 10

Table 3.--Growing Season

(Recorded in the period 1961-90 at West Union, West Virginia)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	180	152	132
8 years in 10	186	161	140
5 years in 10	198	179	156
2 years in 10	209	196	171
1 year in 10	215	206	179

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
Ch	Chagrin silt loam	2,328	1.1
Co	Cotaco silt loam	444	0.2
GaC	Gallia silt loam, 8 to 15 percent slopes	91	*
GpE	Gilpin-Peabody complex, 25 to 35 percent slopes	1,947	0.9
GsE	Gilpin-Peabody complex, 15 to 35 percent slopes, very stony	45,680	22.3
GsF	Gilpin-Peabody complex, 35 to 70 percent slopes, very stony	122,312	59.6
GuC	Gilpin-Upshur complex, 8 to 15 percent slopes	3,146	1.5
GuD	Gilpin-Upshur complex, 15 to 25 percent slopes	11,273	5.5
GyD	Gilpin-Upshur-Urban land complex, 15 to 25 percent slopes	72	*
Ha	Hackers silt loam	67	*
Ka	Kanawha loam	660	0.3
Ku	Kanawha-Urban land complex	38	*
Me	Melvin silt loam	99	*
MoB	Monongahela silt loam, 3 to 8 percent slopes	242	0.1
MoC	Monongahela silt loam, 8 to 15 percent slopes	255	0.1
MuB	Monongahela-Urban land complex, 3 to 8 percent slopes	34	*
MuC	Monongahela-Urban land complex, 8 to 15 percent slopes	46	*
Se	Sensabaugh silt loam	5,994	2.9
SeB	Sensabaugh silt loam, 3 to 8 percent slopes, rarely flooded	5,031	2.5
Su	Sensabaugh-Urban land complex	168	*
SuB	Sensabaugh-Urban land complex, 3 to 8 percent slopes, rarely flooded	67	*
Ud	Udorthents, smoothed	1,278	0.6
VaC	Vandalia silt loam, 8 to 15 percent slopes	277	0.1
VaD	Vandalia silt loam, 15 to 25 percent slopes	1,503	0.7
VaE	Vandalia silt loam, 25 to 35 percent slopes	136	*
VsE	Vandalia silt loam, 15 to 35 percent slopes, very stony	1,514	0.7
VuD	Vandalia-Urban land complex, 15 to 25 percent slopes	52	*
W	Water	446	0.2
	Total	205,200	100.0

* Less than 0.05 percent. The combined extent of the soils assigned an asterisk in the "Percent" column is about 0.7 percent of the survey area.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Orchardgrass hay	Pasture	Tall fescue hay
		Bu	Tons	Tons	AUM	Tons
Ch--------------------- Chagrin	2w	130	4.00	4.00	6.00	4.00
Co--------------------- Cotaco	2w	110	3.00	3.00	6.00	3.00
GaC-------------------- Gallia	3e	115	3.50	3.50	6.00	3.50
GpE--------------------		---	2.00	2.00	4.50	2.00
Gilpin----------------	6e					
Peabody---------------	7e					
GsE--------------------		---	---	---	4.00	---
Gilpin----------------	7s					
Peabody---------------	7s					
GsF--------------------		---	---	---	---	---
Gilpin----------------	7s					
Peabody---------------	7s					
GuC--------------------		90	3.00	3.00	5.00	3.00
Gilpin----------------	3e					
Upshur----------------	4e					
GuD--------------------		85	2.50	2.50	5.00	2.50
Gilpin----------------	4e					
Upshur----------------	6e					
GyD--------------------		---	---	---	---	---
Gilpin----------------	4e					
Upshur----------------	6e					
Urban land------------	---					
Ha--------------------- Hackers	1	135	4.00	4.00	6.00	4.00
Ka--------------------- Kanawha	1	135	4.00	4.00	6.00	4.00
Ku---------------------		---	---	---	---	---
Kanawha---------------	1					
Urban land------------	---					
Me--------------------- Melvin	3w	80	3.00	3.00	6.00	3.00
MoB-------------------- Monongahela	2e	110	3.00	3.00	6.00	3.00
MoC-------------------- Monongahela	3e	105	3.00	3.00	6.00	3.00
MuB--------------------		---	---	---	---	---
Monongahela-----------	2e					
Urban land------------	---					

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Orchardgrass hay	Pasture	Tall fescue hay
		Bu	Tons	Tons	AUM	Tons
MuC:		---	---	---	---	---
Monongahela	3e					
Urban land	---					
Se: Sensabaugh	2w	110	3.50	3.50	6.00	3.50
SeB: Sensabaugh	2e	105	3.50	3.50	6.00	3.50
Su:		---	---	---	---	---
Sensabaugh	2w					
Urban land	---					
SuB:		---	---	---	---	---
Sensabaugh	2e					
Urban land	---					
Ud: Udorthents	---	---	---	---	---	---
VaC: Vandalia	3e	95	3.00	3.00	5.50	3.00
VaD: Vandalia	4e	90	2.50	2.50	5.00	2.50
VaE: Vandalia	6e	---	2.00	2.00	4.50	2.00
VsE: Vandalia	7s	---	---	---	4.00	---
VuD:		---	---	---	---	---
Vandalia	4e					
Urban land	---					

Table 6.--Capability Class and Subclass

Capability class	Capability subclass	Acreage
Unclassified	---	2,201
1	---	727
2	e	5,273
2	w	8,766
3	e	2,196
3	w	99
4	e	8,713
6	e	6,746
7	e	973
7	s	169,506

Table 7.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
Ch	Chagrin silt loam
Co	Cotaco silt loam
Ha	Hackers silt loam
Ka	Kanawha loam
Se	Sensabaugh silt loam
SeB	Sensabaugh silt loam, 3 to 8 percent slopes, rarely flooded

Table 8a.--Agricultural Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin-----------	90	Somewhat limited		Very limited		Somewhat limited	
		Flooding	0.60	Flooding	1.00	Flooding	0.60
		Too acid	0.11	Too acid	0.42	Too acid	0.42
Co:							
Cotaco------------	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too acid	0.22	Too acid	0.77	Too acid	0.77
				Flooding	0.40		
GaC:							
Gallia------------	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
		Too acid	0.01	Too acid	0.03	Too steep for sprinkler application	0.78
						Too acid	0.03
GpE:							
Gilpin------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Too acid	0.43	Slope	1.00	Too steep for sprinkler application	1.00
		Droughty	0.35	Too acid	0.99	Too acid	0.99
		Depth to bedrock	0.20	Droughty	0.35	Droughty	0.35
				Depth to bedrock	0.20	Depth to bedrock	0.20
Peabody-----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Restricted permeability	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Droughty	0.97	Slope	1.00	Too steep for sprinkler application	1.00
		Depth to bedrock	0.71	Too acid	0.99	Too acid	0.99
		Too acid	0.43	Droughty	0.97	Droughty	0.97
GsE:							
Gilpin------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Too acid	0.43	Slope	1.00	Too steep for sprinkler application	1.00
		Droughty	0.35	Too acid	0.99	Too acid	0.99
		Depth to bedrock	0.20	Droughty	0.35	Droughty	0.35
				Depth to bedrock	0.20	Depth to bedrock	0.20

Table 8a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
GsE:							
Peabody-----------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Restricted permeability	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Droughty	0.97	Slope	1.00	Too steep for sprinkler application	1.00
		Depth to bedrock	0.71	Too acid	0.99	Too acid	0.99
		Too acid	0.43	Droughty	0.97	Droughty	0.97
GsF:							
Gilpin------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Too acid	0.43	Slope	1.00	Too steep for sprinkler application	1.00
		Droughty	0.35	Too acid	0.99	Too acid	0.99
		Depth to bedrock	0.20	Droughty	0.35	Droughty	0.35
				Depth to bedrock	0.20	Depth to bedrock	0.20
Peabody-----------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Restricted permeability	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Droughty	0.97	Slope	1.00	Too steep for sprinkler application	1.00
		Depth to bedrock	0.71	Too acid	0.99	Too acid	0.99
		Too acid	0.43	Droughty	0.97	Droughty	0.97
GuC:							
Gilpin------------	40	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Low adsorption	1.00	Too steep for surface application	1.00
		Too acid	0.43	Too acid	0.99	Too acid	0.99
		Droughty	0.35	Slope	0.63	Too steep for sprinkler application	0.78
		Depth to bedrock	0.20	Droughty	0.35	Droughty	0.35
				Depth to bedrock	0.20	Depth to bedrock	0.20
Upshur------------	40	Very limited		Very limited		Very limited	
		Restricted permeability	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Slope	0.63	Restricted permeability	1.00	Restricted permeability	1.00
		Runoff	0.40	Slope	0.63	Too steep for sprinkler application	0.78
		Too acid	0.14	Too acid	0.55	Too acid	0.55

Table 8a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
GuD:							
Gilpin------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Too acid	0.43	Slope	1.00		
		Droughty	0.35	Too acid	0.99		
		Depth to bedrock	0.20	Droughty	0.35	Too steep for sprinkler application	1.00
				Depth to bedrock	0.20		
						Too acid	0.99
						Droughty	0.35
						Depth to bedrock	0.20
Upshur------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Slope	1.00		
				Restricted permeability	1.00		
		Runoff	0.40			Too steep for sprinkler application	1.00
		Too acid	0.14	Too acid	0.55		
						Restricted permeability	1.00
						Too acid	0.55
GyD:							
Gilpin------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Too acid	1.00	Slope	1.00		
		Droughty	0.35	Too acid	0.99		
		Depth to bedrock	0.20	Droughty	0.35	Too steep for sprinkler application	1.00
				Depth to bedrock	0.20		
						Too acid	0.99
						Droughty	0.35
						Depth to bedrock	0.20
Upshur------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Low adsorption	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Slope	1.00		
				Restricted permeability	1.00		
		Runoff	0.40			Too steep for sprinkler application	1.00
		Too acid	0.14	Too acid	0.55		
						Restricted permeability	1.00
						Too acid	0.55
Urban land--------	20	Not rated		Not rated		Not rated	
Ha:							
Hackers-----------	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Too acid	0.22	Too acid	0.77	Too acid	0.77
				Flooding	0.40		
Ka:							
Kanawha-----------	85	Not limited		Somewhat limited		Not limited	
				Flooding	0.40		
Ku:							
Kanawha-----------	65	Not limited		Somewhat limited		Not limited	
				Flooding	0.40		
Urban land--------	20	Not rated		Not rated		Not rated	

Table 8a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste: Rating class and limiting features	Value	Application of sewage sludge: Rating class and limiting features	Value	Disposal of wastewater by irrigation: Rating class and limiting features	Value
Me:							
Melvin	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Runoff	0.40	Flooding	0.40		
MoB:							
Monongahela	85	Very limited		Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Depth to saturated zone	0.99
						Too steep for surface application	0.68
MoC:							
Monongahela	70	Very limited		Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00	Too steep for surface application	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Restricted permeability	1.00
		Slope	0.63	Slope	0.63	Depth to saturated zone	0.99
						Too steep for sprinkler application	0.78
MuB:							
Monongahela	50	Very limited		Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00	Restricted permeability	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Depth to saturated zone	0.99
						Too steep for surface application	0.68
Urban land	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela	45	Very limited		Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00	Too steep for surface application	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Restricted permeability	1.00
		Slope	0.63	Slope	0.63	Depth to saturated zone	0.99
						Too steep for sprinkler application	0.78
Urban land	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh	75	Somewhat limited		Very limited		Somewhat limited	
		Flooding	0.60	Flooding	1.00	Flooding	0.60

Table 8a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SeB:							
Sensabaugh--------	80	Not limited		Somewhat limited		Somewhat limited	
				Flooding	0.40	Too steep for surface application	0.68
Su:							
Sensabaugh--------	60	Somewhat limited		Very limited		Somewhat limited	
		Flooding	0.60	Flooding	1.00	Flooding	0.60
Urban land--------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh--------	70	Not limited		Somewhat limited		Somewhat limited	
				Flooding	0.40	Too steep for surface application	0.68
Urban land--------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents--------	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia----------	90	Very limited		Very limited		Very limited	
		Restricted permeability	1.00	Restricted permeability	1.00	Too steep for surface application	1.00
		Slope	0.63	Slope	0.63		
		Runoff	0.40	Too acid	0.21	Restricted permeability	1.00
		Too acid	0.05				
						Too steep for sprinkler application	0.78
						Too acid	0.21
VaD:							
Vandalia----------	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Restricted permeability	1.00		
		Runoff	0.40	Too acid	0.21	Too steep for sprinkler application	1.00
		Too acid	0.05				
						Restricted permeability	1.00
						Too acid	0.21
VaE:							
Vandalia----------	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Restricted permeability	1.00		
		Runoff	0.40	Too acid	0.21	Too steep for sprinkler application	1.00
		Too acid	0.05				
						Restricted permeability	1.00
						Too acid	0.21

Table 8a.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food-processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
VsE:							
Vandalia----------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Runoff	0.40	Too acid	0.21	Restricted permeability	1.00
		Too acid	0.05			Too acid	0.21
VuD:							
Vandalia----------	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Runoff	0.40	Too acid	0.21	Restricted permeability	1.00
		Too acid	0.05			Too acid	0.21
Urban land--------	20	Not rated		Not rated		Not rated	

Table 8b.--Agricultural Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
Ch:							
Chagrin	90	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Seepage	1.00	Restricted permeability	0.62	Too acid	0.42
		Too acid	0.42	Flooding	0.60		
Co:							
Cotaco	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage	1.00	Restricted permeability	1.00	Too acid	0.77
		Too acid	0.77				
		Flooding	0.40				
GaC:							
Gallia	60	Very limited		Very limited		Very limited	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.03			Too acid	0.03
GpE:							
Gilpin	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Too steep for surface application	1.00	Depth to bedrock	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.99	Too acid	0.14	Too acid	0.99
Peabody	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Restricted permeability	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Depth to bedrock	1.00
		Seepage	1.00	Depth to bedrock	1.00	Too steep for surface application	1.00
		Too acid	0.99	Too acid	0.03	Too steep for sprinkler application	1.00
						Too acid	0.99

Table 8b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater		Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GsE:							
Gilpin	50	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Too steep for	1.00	Depth to bedrock	1.00	Too steep for	1.00
		surface		Restricted	1.00	surface	
		application		permeability		application	
		Seepage	1.00	Too acid	0.14	Too steep for	1.00
		Too acid	0.99			sprinkler	
						application	
						Too acid	0.99
Peabody	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Restricted	1.00
		Too steep for	1.00	Restricted	1.00	permeability	
		surface		permeability		Depth to bedrock	1.00
		application	1.00	Depth to bedrock	1.00	Too steep for	1.00
		Seepage	1.00	Too acid	0.03	surface	
		Too acid	0.99			application	
						Too steep for	1.00
						sprinkler	
						application	
						Too acid	0.99
GsF:							
Gilpin	50	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Too steep for	1.00	Depth to bedrock	1.00	Too steep for	1.00
		surface		Restricted	1.00	surface	
		application		permeability		application	
		Seepage	1.00	Too acid	0.14	Too steep for	1.00
		Too acid	0.99			sprinkler	
						application	
						Too acid	0.99
Peabody	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Restricted	1.00
		Too steep for	1.00	Restricted	1.00	permeability	
		surface		permeability		Depth to bedrock	1.00
		application		Depth to bedrock	1.00	Too steep for	1.00
		Seepage	1.00	Too acid	0.03	surface	
		Too acid	0.99			application	
						Too steep for	1.00
						sprinkler	
						application	
						Too acid	0.99
GuC:							
Gilpin	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Seepage	1.00	Depth to bedrock	1.00	Too steep for	1.00
		Too steep for	1.00	Restricted	1.00	surface	
		surface		permeability		application	
		application		Too acid	0.14	Too steep for	1.00
		Too acid	0.99			sprinkler	
						application	
						Too acid	0.99

Table 8b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
GuC:							
Upshur--------------	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.55	Depth to bedrock	1.00	Restricted permeability	0.96
		Depth to bedrock	0.02			Too acid	0.55
						Depth to bedrock	0.02
GuD:							
Gilpin--------------	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Too steep for surface application	1.00	Depth to bedrock	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.99	Too acid	0.14	Too acid	0.99
Upshur--------------	40	Very limited		Very limited		Very limited	
		Too steep for surface application	1.00	Slope	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.55	Depth to bedrock	1.00	Restricted permeability	0.96
		Depth to bedrock	0.02			Too acid	0.55
						Depth to bedrock	0.02
GyD:							
Gilpin--------------	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Too steep for surface application	1.00	Depth to bedrock	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.99	Too acid	0.14	Too acid	0.99
GyD:							
Upshur--------------	30	Very limited		Very limited		Very limited	
		Too steep for surface application	1.00	Slope	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.55	Depth to bedrock	1.00	Restricted permeability	0.96
		Depth to bedrock	0.02			Too acid	0.55
						Depth to bedrock	0.02
Urban land----------	20	Not rated		Not rated		Not rated	

Table 8b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
Ha:							
Hackers	80	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Restricted permeability	1.00	Too acid	0.77
		Too acid	0.77				
		Flooding	0.40				
Ka:							
Kanawha	85	Very limited		Very limited		Not limited	
		Seepage	1.00	Restricted permeability	1.00		
		Flooding	0.40				
Ku:							
Kanawha	65	Very limited		Very limited		Not limited	
		Seepage	1.00	Restricted permeability	1.00		
		Flooding	0.40				
Urban land	20	Not rated		Not rated		Not rated	
Me:							
Melvin	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage	1.00	Restricted permeability	1.00		
		Flooding	0.40				
MoB:							
Monongahela	85	Very limited		Very limited		Very limited	
		Seepage	1.00	Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Restricted permeability	0.96
				Slope	0.50	Too steep for surface application	0.68
MoC:							
Monongahela	70	Very limited		Very limited		Very limited	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Depth to saturated zone	0.99
						Restricted permeability	0.96
MuB:							
Monongahela	50	Very limited		Very limited		Very limited	
		Seepage	1.00	Restricted permeability	1.00	Depth to saturated zone	0.99
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Restricted permeability	0.96
				Slope	0.50	Too steep for surface application	0.68
Urban land	35	Not rated		Not rated		Not rated	

Table 8b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
MuC:							
Monongahela	45	Very limited		Very limited		Very limited	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Depth to saturated zone	0.99
						Restricted permeability	0.96
Urban land	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh	75	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Seepage	1.00	Restricted permeability	0.62		
				Flooding	0.60		
SeB:							
Sensabaugh	80	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	1.00	Too steep for surface application	0.68
		Flooding	0.40	Restricted permeability	0.62		
				Slope	0.50		
Su:							
Sensabaugh	60	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Seepage	1.00	Restricted permeability	0.62		
				Flooding	0.60		
Urban land	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh	70	Very limited		Very limited		Somewhat limited	
		Seepage	1.00	Depth to saturated zone	1.00	Too steep for surface application	0.68
		Flooding	0.40	Restricted permeability	0.62		
				Slope	0.50		
Urban land	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents	90	Not rated		Not rated		Not rated	

Table 8b.--Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Overland flow of wastewater: Rating class and limiting features	Value	Rapid infiltration of wastewater: Rating class and limiting features	Value	Slow rate treatment of wastewater: Rating class and limiting features	Value
VaC:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Slope	1.00	Too steep for surface application	1.00
		Too steep for surface application	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.21	Depth to saturated zone	1.00	Restricted permeability	0.96
						Too acid	0.21
VaD:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Too steep for surface application	1.00	Slope	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.21	Depth to saturated zone	1.00	Restricted permeability	0.96
						Too acid	0.21
VaE:							
Vandalia------------	80	Very limited		Very limited		Very limited	
		Too steep for surface application	1.00	Slope	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.21	Depth to saturated zone	1.00	Restricted permeability	0.96
						Too acid	0.21
VsE:							
Vandalia------------	85	Very limited		Very limited		Very limited	
		Too steep for surface application	1.00	Slope	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.21	Depth to saturated zone	1.00	Restricted permeability	0.96
						Too acid	0.21
VuD:							
Vandalia------------	70	Very limited		Very limited		Very limited	
		Too steep for surface application	1.00	Slope	1.00	Too steep for surface application	1.00
		Seepage	1.00	Restricted permeability	1.00	Too steep for sprinkler application	1.00
		Too acid	0.21	Depth to saturated zone	1.00	Restricted permeability	0.96
						Too acid	0.21
Urban land----------	20	Not rated		Not rated		Not rated	

Table 9.--Forestland Productivity

Map symbol and soil name	Potential productivity: Common trees	Site index	Annual production (CMAI)	Trees to manage
			cu ft/ac	
Ch:				
Chagrin	American beech	---	---	Black oak, eastern white pine, sugar maple, white oak, yellow-poplar
	American sycamore	---	---	
	Black oak	---	---	
	Boxelder	---	---	
	Eastern white pine	86	157	
	Northern red oak	85	67	
	Sugar maple	86	53	
	White ash	---	---	
	White oak	---	---	
	Yellow-poplar	96	100	
Co:				
Cotaco	American beech	---	---	Black oak, eastern white pine, sugar maple, white oak, yellow-poplar
	American sycamore	---	---	
	Black oak	73	55	
	Eastern white pine	---	---	
	Northern red oak	86	68	
	Sugar maple	---	---	
	White ash	85	57	
	White oak	80	62	
	Yellow-poplar	95	98	
GaC:				
Gallia	Black oak	---	---	Black oak, eastern white pine, hickory, sugar maple, white oak, yellow-poplar
	Hickory	---	---	
	Northern red oak	95	77	
	Sugar maple	---	---	
	White oak	85	67	
	Yellow-poplar	95	98	
GpE:				
Gilpin	Black oak	78	60	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Chestnut oak	70	52	
	Hickory	---	---	
	Northern red oak	80	62	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	70	52	
	Yellow-poplar	90	90	
Peabody	Black oak	---	---	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Hickory	---	---	
	Northern red oak	70	52	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	65	47	
	Yellow-poplar	90	90	
GsE:				
Gilpin	Black oak	78	60	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Chestnut oak	70	52	
	Hickory	---	---	
	Northern red oak	80	62	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	70	52	
	Yellow-poplar	90	90	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Annual production (CMAI)	Trees to manage
			cu ft/ac	
GsE:				
Peabody	Black oak	---	---	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Hickory	---	---	
	Northern red oak	70	52	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	65	47	
	Yellow-poplar	90	90	
GsF:				
Gilpin	Black oak	78	60	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Chestnut oak	70	52	
	Hickory	---	---	
	Northern red oak	80	62	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	70	52	
	Yellow-poplar	90	90	
Peabody	Black oak	---	---	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Hickory	---	---	
	Northern red oak	70	52	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	65	47	
	Yellow-poplar	90	90	
GuC:				
Gilpin	Black oak	78	60	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Chestnut oak	70	52	
	Hickory	---	---	
	Northern red oak	80	62	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	70	52	
	Yellow-poplar	90	90	
Upshur	Black oak	74	56	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut	---	---	
	Eastern white pine	85	155	
	Hickory	---	---	
	Northern red oak	74	56	
	Sugar maple	80	50	
	Virginia pine	70	109	
	White oak	72	54	
	Yellow-poplar	90	90	
GuD:				
Gilpin	Black oak	78	60	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Chestnut oak	70	52	
	Hickory	---	---	
	Northern red oak	80	62	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	70	52	
	Yellow-poplar	90	90	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site index	Annual production (CMAI)	
			cu ft/ac	
GuD:				
Upshur	Black oak	74	56	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut	---	---	
	Eastern white pine	85	155	
	Hickory	---	---	
	Northern red oak	74	56	
	Sugar maple	80	50	
	Virginia pine	70	109	
	White oak	72	54	
	Yellow-poplar	90	90	
GyD:				
Gilpin	Black oak	78	60	Black oak, hickory, sugar maple, white oak, yellow-poplar
	Chestnut oak	70	52	
	Hickory	---	---	
	Northern red oak	80	62	
	Scarlet oak	---	---	
	Sugar maple	---	---	
	Virginia pine	---	---	
	White oak	70	52	
	Yellow-poplar	90	90	
Upshur	Black oak	74	56	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut	---	---	
	Eastern white pine	85	155	
	Hickory	---	---	
	Northern red oak	74	56	
	Sugar maple	80	50	
	Virginia pine	70	109	
	White oak	72	54	
	Yellow-poplar	90	90	
Urban land	---	---	---	---
Ha:				
Hackers	American sycamore	---	---	Black oak, sugar maple, white oak, yellow-poplar
	Black oak	---	---	
	Northern red oak	85	67	
	Sugar maple	---	---	
	White ash	85	57	
	White oak	85	67	
	Yellow-poplar	95	98	
Ka:				
Kanawha	American sycamore	---	---	Black oak, sugar maple, white oak, yellow-poplar
	Black oak	80	62	
	Northern red oak	85	67	
	Sugar maple	80	50	
	White ash	80	49	
	White oak	80	62	
	Yellow-poplar	90	90	
Ku:				
Kanawha	American sycamore	---	---	Black oak, sugar maple, white oak, yellow-poplar
	Black oak	80	62	
	Northern red oak	85	67	
	Sugar maple	80	50	
	White ash	80	49	
	White oak	80	62	
	Yellow-poplar	90	90	
Urban land	---	---	---	---

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Annual production (CMAI)	Trees to manage
			cu ft/ac	
Me:				
Melvin-------------	American sycamore---	---	---	Pin oak, sugar maple
	Boxelder------------	---	---	
	Pin oak-------------	95	92	
	Sugar maple---------	89	54	
MoB:				
Monongahela--------	Black oak-----------	---	---	Black oak, eastern white pine, hickory, sugar maple, white oak, yellow-poplar
	Eastern white pine--	72	126	
	Northern red oak----	70	52	
	Sugar maple---------	---	---	
	Virginia pine-------	64	98	
	White oak-----------	70	52	
	Yellow-poplar-------	82	75	
MoC:				
Monongahela--------	Black oak-----------	---	---	Black oak, eastern white pine, hickory, sugar maple, white oak yellow-poplar
	Eastern white pine--	72	126	
	Northern red oak----	70	52	
	Sugar maple---------	---	---	
	Virginia pine-------	64	98	
	White oak-----------	70	52	
	Yellow-poplar-------	82	75	
MuB:				
Monongahela--------	Black oak-----------	---	---	Black oak, eastern white pine, hickory, sugar maple, white oak, yellow-poplar
	Eastern white pine--	72	126	
	Northern red oak----	70	52	
	Sugar maple---------	---	---	
	Virginia pine-------	64	98	
	White oak-----------	70	52	
	Yellow-poplar-------	82	75	
Urban land---------	---	---	---	---
MuC:				
Monongahela--------	Black oak-----------	---	---	Black oak, eastern white pine, hickory, sugar maple, white oak, yellow-poplar
	Eastern white pine--	72	126	
	Northern red oak----	70	52	
	Sugar maple---------	---	---	
	Virginia pine-------	64	98	
	White oak-----------	70	52	
	Yellow-poplar-------	82	75	
Urban land---------	---	---	---	---
Se:				
Sensabaugh---------	American sycamore---	---	---	Black oak, eastern white pine, hickory, sugar maple, white oak, yellow-poplar
	Black oak-----------	---	---	
	Boxelder------------	---	---	
	Northern red oak----	86	68	
	Sugar maple---------	85	52	
	Virginia pine-------	75	115	
	White oak-----------	80	62	
	Yellow-poplar-------	100	107	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Annual production (CMAI)	Trees to manage
			cu ft/ac	
SeB:				
Sensabaugh	American sycamore	---	---	Black oak, eastern white pine, hickory, sugar maple, white oak, yellow-poplar
	Black oak	---	---	
	Boxelder	---	---	
	Northern red oak	86	68	
	Sugar maple	85	52	
	Virginia pine	75	115	
	White oak	80	62	
	Yellow-poplar	100	107	
Su:				
Sensabaugh	American sycamore	---	---	Black oak, eastern white pine, sugar maple, white oak, yellow-poplar
	Black oak	---	---	
	Boxelder	---	---	
	Northern red oak	86	68	
	Sugar maple	85	52	
	Virginia pine	75	115	
	White oak	80	62	
	Yellow-poplar	100	107	
Urban land	---	---	---	---
SuB:				
Sensabaugh	American sycamore	---	---	Black oak, eastern white pine, sugar maple, white oak, yellow-poplar
	Black oak	---	---	
	Boxelder	---	---	
	Northern red oak	86	68	
	Sugar maple	85	52	
	Virginia pine	75	115	
	White oak	80	62	
	Yellow-poplar	100	107	
Urban land	---	---	---	---
Ud:				
Udorthents	---	---	---	---
VaC:				
Vandalia	Black oak	---	---	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut	---	---	
	Hickory	---	---	
	Northern red oak	76	58	
	Sugar maple	---	---	
	Virginia pine	75	115	
	White oak	74	56	
	Yellow-poplar	90	90	
VaD:				
Vandalia	Black oak	---	---	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut	---	---	
	Hickory	---	---	
	Northern red oak	76	58	
	Sugar maple	---	---	
	Virginia pine	75	115	
	White oak	74	56	
	Yellow-poplar	90	90	

Table 9.--Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index	Annual production (CMAI)	Trees to manage
			cu ft/ac	
VaE:				
Vandalia-----------	Black oak-----------	---	---	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut--------	---	---	
	Hickory-------------	---	---	
	Northern red oak----	76	58	
	Sugar maple---------	---	---	
	Virginia pine-------	75	115	
	White oak-----------	74	56	
	Yellow-poplar-------	90	90	
VsE:				
Vandalia-----------	Black oak-----------	---	---	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut--------	---	---	
	Hickory-------------	---	---	
	Northern red oak----	76	58	
	Sugar maple---------	---	---	
	Virginia pine-------	75	115	
	White oak-----------	74	56	
	Yellow-poplar-------	90	90	
VuD:				
Vandalia-----------	Black oak-----------	---	---	Black oak, black walnut, hickory, sugar maple, white oak, yellow-poplar
	Black walnut--------	---	---	
	Hickory-------------	---	---	
	Northern red oak----	76	58	
	Sugar maple---------	---	---	
	Virginia pine-------	75	115	
	White oak-----------	74	56	
	Yellow-poplar-------	90	90	
Urban land---------	---	---	---	---

Table 10a.--Forestland Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin------------	90	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
Co:							
Cotaco-------------	70	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Wetness	0.50		
GaC:							
Gallia-------------	60	Moderate		Moderately suited		Severe	
		Low strength	0.50	Slope	0.50	Low strength	1.00
				Low strength	0.50		
GpE:							
Gilpin-------------	40	Moderate		Poorly suited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Restrictive layer	0.50	Low strength	0.50		
		Low strength	0.50	Landslides	0.10		
		Landslides	0.10				
Peabody------------	40	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Restrictive layer	0.50	Low strength	0.50		
		Low strength	0.50				
GsE:							
Gilpin-------------	50	Moderate		Poorly suited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Restrictive layer	0.50	Low strength	0.50		
		Low strength	0.50	Landslides	0.10		
		Landslides	0.10				
Peabody------------	35	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Restrictive layer	0.50	Low strength	0.50		
		Low strength	0.50				
GsF:							
Gilpin-------------	50	Severe		Poorly suited		Severe	
		Slope	1.00	Slope	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
		Landslides	0.10	Landslides	0.10		
Peabody------------	30	Severe		Poorly suited		Severe	
		Slope	1.00	Slope	1.00	Low strength	1.00
		Landslides	1.00	Landslides	1.00		
		Low strength	0.50	Low strength	0.50		
GuC:							
Gilpin-------------	40	Moderate		Moderately suited		Severe	
		Restrictive layer	0.50	Slope	0.50	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
		Landslides	0.10	Landslides	0.10		

Table 10a.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings: Rating class and limiting features	Value	Suitability for log landings: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
GuC:							
Upshur-------------	40	Severe		Poorly suited		Severe	
		Landslides	1.00	Landslides	1.00	Low strength	1.00
				Slope	0.50		
				Low strength	0.50		
GuD:							
Gilpin-------------	40	Moderate		Poorly suited		Severe	
		Restrictive layer	0.50	Slope	1.00	Low strength	1.00
		Slope	0.50	Low strength	0.50		
		Low strength	0.50	Landslides	0.10		
		Landslides	0.10				
Upshur-------------	40	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Low strength	0.50	Low strength	0.50		
		Stickiness/slope	0.50				
GyD:							
Gilpin-------------	40	Moderate		Poorly suited		Severe	
		Restrictive layer	0.50	Slope	1.00	Low strength	1.00
		Slope	0.50	Low strength	0.50		
		Low strength	0.50	Landslides	0.10		
		Landslides	0.10				
Upshur-------------	30	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Low strength	0.50	Low strength	0.50		
		Stickiness/slope	0.50				
Urban land---------	20	Not rated		Not rated		Not rated	
Ha:							
Hackers------------	80	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
Ka:							
Kanawha------------	85	Slight		Moderately suited		Severe	
				Low strength	0.50	Low strength	1.00
Ku:							
Kanawha------------	65	Slight		Moderately suited		Severe	
				Low strength	0.50	Low strength	1.00
Urban land---------	20	Not rated		Not rated		Not rated	
Me:							
Melvin-------------	75	Severe		Poorly suited		Severe	
		Wetness	1.00	Wetness	1.00	Low strength	1.00
				Low strength	0.50	Wetness	0.50
MoB:							
Monongahela--------	85	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		

Table 10a.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings		Suitability for log landings		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MoC:							
Monongahela--------	70	Moderate		Moderately suited		Severe	
		Low strength	0.50	Slope	0.50	Low strength	1.00
				Low strength	0.50		
MuB:							
Monongahela--------	50	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
Urban land---------	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela--------	45	Moderate		Moderately suited		Severe	
		Low strength	0.50	Slope	0.50	Low strength	1.00
				Low strength	0.50		
Urban land---------	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh---------	75	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
SeB:							
Sensabaugh---------	80	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
Su:							
Sensabaugh---------	60	Severe		Poorly suited		Severe	
		Flooding	1.00	Flooding	1.00	Low strength	1.00
		Low strength	0.50	Low strength	0.50		
Urban land---------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh---------	70	Moderate		Moderately suited		Severe	
		Low strength	0.50	Low strength	0.50	Low strength	1.00
				Slope	0.50		
Urban land---------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents---------	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia-----------	90	Severe		Poorly suited		Severe	
		Landslides	1.00	Landslides	1.00	Low strength	1.00
		Low strength	0.50	Slope	0.50		
				Low strength	0.50		
VaD:							
Vandalia-----------	90	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Low strength	0.50	Low strength	0.50		

Table 10a.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Limitations affecting construction of haul roads and log landings: Rating class and limiting features	Value	Suitability for log landings: Rating class and limiting features	Value	Soil rutting hazard: Rating class and limiting features	Value
VaE:							
Vandalia-----------	80	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Low strength	0.50	Low strength	0.50		
VsE:							
Vandalia-----------	85	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Low strength	0.50	Low strength	0.50		
VuD:							
Vandalia-----------	70	Severe		Poorly suited		Severe	
		Landslides	1.00	Slope	1.00	Low strength	1.00
		Slope	0.50	Landslides	1.00		
		Low strength	0.50	Low strength	0.50		
Urban land---------	20	Not rated		Not rated		Not rated	

Table 10b.--Forestland Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin	90	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
Co:							
Cotaco	70	Slight		Slight		Moderately suited	
						Low strength	0.50
						Wetness	0.50
GaC:							
Gallia	60	Moderate		Severe		Moderately suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
GpE:							
Gilpin	40	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
Peabody	40	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
GsE:							
Gilpin	50	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
Peabody	35	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
GsF:							
Gilpin	50	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
Peabody	30	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
GuC:							
Gilpin	40	Slight		Severe		Moderately suited	
				Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
						Landslides	0.10

Table 10b.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
GuC:							
Upshur--------------	40	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Landslides	1.00
						Slope	0.50
						Low strength	0.50
GuD:							
Gilpin--------------	40	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
Upshur--------------	40	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
GyD:							
Gilpin--------------	40	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Landslides	0.10
Upshur--------------	30	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
Urban land----------	20	Not rated		Not rated		Not rated	
Ha:							
Hackers-------------	80	Slight		Slight		Moderately suited	
						Low strength	0.50
Ka:							
Kanawha-------------	85	Slight		Slight		Moderately suited	
						Low strength	0.50
Ku:							
Kanawha-------------	65	Slight		Slight		Moderately suited	
						Low strength	0.50
Urban land----------	20	Not rated		Not rated		Not rated	
Me:							
Melvin--------------	75	Slight		Slight		Poorly suited	
						Wetness	1.00
						Low strength	0.50
MoB:							
Monongahela---------	85	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
MoC:							
Monongahela---------	70	Moderate		Severe		Moderately suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50

Table 10b.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MuB:							
Monongahela	50	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
Urban land	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela	45	Moderate		Severe		Moderately suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	0.50
						Low strength	0.50
Urban land	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh	75	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
SeB:							
Sensabaugh	80	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
Su:							
Sensabaugh	60	Slight		Slight		Poorly suited	
						Flooding	1.00
						Low strength	0.50
Urban land	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh	70	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Low strength	0.50
						Slope	0.50
Urban land	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia	90	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Landslides	1.00
						Slope	0.50
						Low strength	0.50
VaD:							
Vandalia	90	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
VaE:							
Vandalia	80	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50

Table 10b.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion: Rating class and limiting features	Value	Hazard of erosion on roads and trails: Rating class and limiting features	Value	Suitability for roads (natural surface): Rating class and limiting features	Value
VsE:							
Vandalia------------	85	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
VuD:							
Vandalia------------	70	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Landslides	1.00
						Low strength	0.50
Urban land----------	20	Not rated		Not rated		Not rated	

Table 10c.--Forestland Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Suitability for use of harvesting equipment	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin	90	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Co:							
Cotaco	70	Well suited		Well suited		Moderately suited	
						Low strength	0.50
GaC:							
Gallia	60	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
GpE:							
Gilpin	40	Well suited		Unsuited		Moderately suited	
				Slope	1.00	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
Peabody	40	Moderately suited		Unsuited		Moderately suited	
		Stickiness	0.50	Slope	1.00	Low strength	0.50
				Stickiness	0.50	Slope	0.50
GsE:							
Gilpin	50	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
Peabody	35	Moderately suited		Poorly suited		Moderately suited	
		Stickiness	0.50	Slope	0.75	Low strength	0.50
				Stickiness	0.50	Slope	0.50
GsF:							
Gilpin	50	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
				Rock fragments	0.50	Low strength	0.50
Peabody	30	Moderately suited		Unsuited		Poorly suited	
		Slope	0.50	Slope	1.00	Slope	1.00
		Stickiness	0.50	Stickiness	0.50	Low strength	0.50
GuC:							
Gilpin	40	Well suited		Moderately suited		Moderately suited	
				Rock fragments	0.50	Low strength	0.50
				Slope	0.50		
Upshur	40	Moderately suited		Moderately suited		Moderately suited	
		Stickiness	0.50	Stickiness	0.50	Low strength	0.50
				Slope	0.50		
GuD:							
Gilpin	40	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
GuD:							
Upshur	40	Moderately suited		Poorly suited		Moderately suited	
		Stickiness	0.50	Slope	0.75	Low strength	0.50
				Stickiness	0.50	Slope	0.50

Table 10c.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Suitability for use of harvesting equipment: Rating class and limiting features	Value
GyD:							
Gilpin	40	Well suited		Poorly suited		Moderately suited	
				Slope	0.75	Low strength	0.50
				Rock fragments	0.50	Slope	0.50
Upshur	30	Moderately suited		Poorly suited		Moderately suited	
		Stickiness	0.50	Slope	0.75	Low strength	0.50
				Stickiness	0.50	Slope	0.50
Urban land	20	Not rated		Not rated		Not rated	
Ha:							
Hackers	80	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Ka:							
Kanawha	85	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Ku:							
Kanawha	65	Well suited		Well suited		Moderately suited	
						Low strength	0.50
Urban land	20	Not rated		Not rated		Not rated	
Me:							
Melvin	75	Moderately suited		Moderately suited		Poorly suited	
		Wetness	0.50	Wetness	0.50	Wetness	1.00
						Low strength	0.50
MoB:							
Monongahela	85	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
MoC:							
Monongahela	70	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
MuB:							
Monongahela	50	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
Urban land	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela	45	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
Urban land	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh	75	Well suited		Well suited		Moderately suited	
						Low strength	0.50
SeB:							
Sensabaugh	80	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
Su:							
Sensabaugh	60	Well suited		Well suited		Moderately suited	
						Low strength	0.50

Table 10c.--Forestland Management--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting: Rating class and limiting features	Value	Suitability for mechanical planting: Rating class and limiting features	Value	Suitability for use of harvesting equipment: Rating class and limiting features	Value
Su:							
Urban land----------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh----------	70	Well suited		Moderately suited		Moderately suited	
				Slope	0.50	Low strength	0.50
Urban land----------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents----------	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia------------	90	Moderately suited		Moderately suited		Moderately suited	
		Stickiness	0.50	Slope	0.50	Low strength	0.50
				Stickiness	0.50		
				Rock fragments	0.50		
VaD:							
Vandalia------------	90	Moderately suited		Poorly suited		Moderately suited	
		Stickiness	0.50	Slope	0.75	Low strength	0.50
				Stickiness	0.50	Slope	0.50
				Rock fragments	0.50		
VaE:							
Vandalia------------	80	Moderately suited		Unsuited		Moderately suited	
		Stickiness	0.50	Slope	1.00	Low strength	0.50
				Stickiness	0.50	Slope	0.50
				Rock fragments	0.50		
VsE:							
Vandalia------------	85	Moderately suited		Poorly suited		Moderately suited	
		Stickiness	0.50	Slope	0.75	Low strength	0.50
				Stickiness	0.50	Slope	0.50
				Rock fragments	0.50		
VuD:							
Vandalia------------	70	Moderately suited		Poorly suited		Moderately suited	
		Stickiness	0.50	Slope	0.75	Low strength	0.50
				Stickiness	0.50	Slope	0.50
				Rock fragments	0.50		
Urban land----------	20	Not rated		Not rated		Not rated	

Table 11a.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin	90	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
Co:							
Cotaco	70	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Depth to saturated zone	0.75	Depth to saturated zone	0.98
		Depth to saturated zone	0.98				
GaC:							
Gallia	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
GpE:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.43
						Depth to bedrock	0.20
Peabody	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Restricted permeability	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Slope	1.00
						Depth to bedrock	0.71
GsE:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.43
						Depth to bedrock	0.20
Peabody	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Restricted permeability	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Slope	1.00
						Depth to bedrock	0.71
GsF:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.43
						Depth to bedrock	0.20
Peabody	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Restricted permeability	1.00
		Restricted permeability	1.00	Restricted permeability	1.00	Slope	1.00
						Depth to bedrock	0.71
GuC:							
Gilpin	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
						Gravel content	0.43
						Depth to bedrock	0.20

Table 11a.—Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GuC:							
Upshur--------------	40	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.96	Restricted permeability	0.96	Slope	1.00
		Slope	0.63	Slope	0.63	Restricted permeability	0.96
GuD:							
Gilpin--------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.43
						Depth to bedrock	0.20
Upshur--------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.96	Restricted permeability	0.96	Restricted permeability	0.96
GyD:							
Gilpin--------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.43
						Depth to bedrock	0.20
Upshur--------------	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.96	Restricted permeability	0.96	Restricted permeability	0.96
Urban land----------	20	Not rated		Not rated		Not rated	
Ha:							
Hackers-------------	80	Very limited		Not limited		Not limited	
		Flooding	1.00				
Ka:							
Kanawha-------------	85	Very limited		Not limited		Not limited	
		Flooding	1.00				
Ku:							
Kanawha-------------	65	Very limited		Not limited		Not limited	
		Flooding	1.00				
Urban land----------	20	Not rated		Not rated		Not rated	
Me:							
Melvin--------------	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00				
MoB:							
Monongahela---------	85	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.96	Restricted permeability	0.96	Slope	1.00
		Depth to saturated zone	0.24	Depth to saturated zone	0.12	Restricted permeability	0.96
						Depth to saturated zone	0.24

Table 11a.—Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
MoC:							
Monongahela---------	70	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.96	Restricted permeability	0.96	Slope	1.00
		Slope	0.63	Slope	0.63	Restricted permeability	0.96
		Depth to saturated zone	0.24	Depth to saturated zone	0.12	Depth to saturated zone	0.24
MuB:							
Monongahela---------	50	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.96	Restricted permeability	0.96	Slope	1.00
		Depth to saturated zone	0.24	Depth to saturated zone	0.12	Restricted permeability	0.96
						Depth to saturated zone	0.24
Urban land----------	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela---------	45	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.96	Restricted permeability	0.96	Slope	1.00
		Slope	0.63	Slope	0.63	Restricted permeability	0.96
		Depth to saturated zone	0.24	Depth to saturated zone	0.12	Depth to saturated zone	0.24
Urban land----------	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh----------	75	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
						Gravel content	0.18
SeB:							
Sensabaugh----------	80	Very limited		Not limited		Very limited	
		Flooding	1.00			Slope	1.00
						Gravel content	0.18
Su:							
Sensabaugh----------	60	Very limited		Not limited		Somewhat limited	
		Flooding	1.00			Flooding	0.60
						Gravel content	0.18
Urban land----------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh----------	70	Very limited		Not limited		Very limited	
		Flooding	1.00			Slope	1.00
						Gravel content	0.18
Urban land----------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents----------	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia------------	90	Somewhat limited		Somewhat limited		Very limited	
		Restricted permeability	0.96	Restricted permeability	0.96	Slope	1.00
		Slope	0.63	Slope	0.63	Restricted permeability	0.96
						Gravel content	0.04

Table 11a.—Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
VaD:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.96	Restricted permeability	0.96	Restricted permeability	0.96
						Gravel content	0.04
VaE:							
Vandalia------------	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.96	Restricted permeability	0.96	Restricted permeability	0.96
						Gravel content	0.04
VsE:							
Vandalia------------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.96	Restricted permeability	0.96	Restricted permeability	0.96
						Gravel content	0.04
VuD:							
Vandalia------------	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.96	Restricted permeability	0.96	Restricted permeability	0.96
						Gravel content	0.04
Urban land----------	20	Not rated		Not rated		Not rated	

Table 11b.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
Ch:							
Chagrin	90	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
Co:							
Cotaco	70	Somewhat limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.44	Depth to saturated zone	0.44	Depth to saturated zone	0.75
GaC:							
Gallia	60	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Slope	0.63
GpE:							
Gilpin	40	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Slope	0.22	Slope	1.00
						Depth to bedrock	0.20
Peabody	40	Very limited		Very limited		Very limited	
		Slope	1.00	Water erosion	1.00	Slope	1.00
		Water erosion	1.00	Slope	0.22	Depth to bedrock	0.71
						Droughty	0.21
GsE:							
Gilpin	50	Very limited		Not limited		Very limited	
		Slope	1.00			Slope	1.00
						Depth to bedrock	0.20
Peabody	35	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	1.00			Depth to bedrock	0.71
						Droughty	0.21
GsF:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.20
Peabody	30	Very limited		Very limited		Very limited	
		Slope	1.00	Water erosion	1.00	Slope	1.00
		Water erosion	1.00	Slope	1.00	Depth to bedrock	0.71
						Droughty	0.21
GuC:							
Gilpin	40	Not limited		Not limited		Somewhat limited	
						Slope	0.63
						Depth to bedrock	0.20
Upshur	40	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Slope	0.63
GuD:							
Gilpin	40	Somewhat limited		Not limited		Very limited	
		Slope	0.50			Slope	1.00
						Depth to bedrock	0.20

Table 11b.—Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GuD:							
Upshur	40	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	0.50				
GyD:							
Gilpin	40	Somewhat limited		Not limited		Very limited	
		Slope	0.50			Slope	1.00
						Depth to bedrock	0.20
Upshur	30	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	0.50				
Urban land	20	Not rated		Not rated		Not rated	
Ha:							
Hackers	80	Not limited		Not limited		Not limited	
Ka:							
Kanawha	85	Not limited		Not limited		Not limited	
Ku:							
Kanawha	65	Not limited		Not limited		Not limited	
Urban land	20	Not rated		Not rated		Not rated	
Me:							
Melvin	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
MoB:							
Monongahela	85	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.12
MoC:							
Monongahela	70	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Slope	0.63
						Depth to saturated zone	0.12
MuB:							
Monongahela	50	Not limited		Not limited		Somewhat limited	
						Depth to saturated zone	0.12
Urban land	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela	45	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Slope	0.63
						Depth to saturated zone	0.12
Urban land	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh	75	Not limited		Not limited		Somewhat limited	
						Flooding	0.60

Table 11b.—Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SeB:							
Sensabaugh----------	80	Not limited		Not limited		Not limited	
Su:							
Sensabaugh----------	60	Not limited		Not limited		Somewhat limited	
						Flooding	0.60
Urban land----------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh----------	70	Not limited		Not limited		Not limited	
Urban land----------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents----------	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia------------	90	Very limited		Very limited		Somewhat limited	
		Water erosion	1.00	Water erosion	1.00	Slope	0.63
VaD:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	0.50				
VaE:							
Vandalia------------	80	Very limited		Very limited		Very limited	
		Slope	1.00	Water erosion	1.00	Slope	1.00
		Water erosion	1.00	Slope	0.22		
VsE:							
Vandalia------------	85	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	1.00				
VuD:							
Vandalia------------	70	Very limited		Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00	Slope	1.00
		Slope	0.50				
Urban land----------	20	Not rated		Not rated		Not rated	

Table 12.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ch:										
Chagrin	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Co:										
Cotaco	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
GaC:										
Gallia	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
GpE:										
Gilpin	Very poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
Peabody	Very poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
GsE:										
Gilpin	Very poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
Peabody	Very poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
GsF:										
Gilpin	Very poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Peabody	Very poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
GuC:										
Gilpin	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Upshur	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
GuD:										
Gilpin	Poor	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Upshur	Poor	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
GyD:										
Gilpin	Poor	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Upshur	Poor	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Urban land	---	---	---	---	---	---	---	---	---	---

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ha:										
Hackers	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Ka:										
Kanawha	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Ku:										
Kanawha	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Urban land	---	---	---	---	---	---	---	---	---	---
Me:										
Melvin	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good
MoB:										
Monongahela	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
MoC:										
Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
MuB:										
Monongahela	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Urban land	---	---	---	---	---	---	---	---	---	---
MuC:										
Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Urban land	---	---	---	---	---	---	---	---	---	---
Se:										
Sensabaugh	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
SeB:										
Sensabaugh	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Su:										
Sensabaugh	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Urban land	---	---	---	---	---	---	---	---	---	---
SuB:										
Sensabaugh	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Urban land	---	---	---	---	---	---	---	---	---	---
Ud:										
Udorthents	---	---	---	---	---	---	---	---	---	---

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
VaC:										
Vandalia	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
VaD:										
Vandalia	Poor	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
VaE:										
Vandalia	Very poor	Fair	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor
VsE:										
Vandalia	Very poor	Fair	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor
VuD:										
Vandalia	Poor	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Urban land	---	---	---	---	---	---	---	---	---	---

Table 13a.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin-------------	90	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.16		
Co:							
Cotaco--------------	70	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.98	Depth to saturated zone	1.00	Depth to saturated zone	0.98
GaC:							
Gallia--------------	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
GpE:							
Gilpin--------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
Peabody-------------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
				Depth to soft bedrock	0.71		
GsE:							
Gilpin--------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
Peabody-------------	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
				Depth to soft bedrock	0.71		
GsF:							
Gilpin--------------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
GsF:							
Peabody	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
				Depth to soft bedrock	0.71		
GuC:							
Gilpin	40	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.20	Slope	0.63	Depth to hard bedrock	0.20
Upshur	40	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
GuD:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
Upshur	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
GyD:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.20	Depth to hard bedrock	1.00	Depth to hard bedrock	0.20
Upshur	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
Urban land	20	Not rated		Not rated		Not rated	
Ha:							
Hackers	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Shrink-swell	0.50			Shrink-swell	0.50
Ka:							
Kanawha	85	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Ku:							
Kanawha	65	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Urban land	20	Not rated		Not rated		Not rated	
Me:							
Melvin	75	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
MoB:							
Monongahela---------	85	Somewhat limited		Very limited		Somewhat limited	
		Depth to saturated zone	0.24	Depth to saturated zone	1.00	Slope	0.50
						Depth to saturated zone	0.24
MoC:							
Monongahela---------	70	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	1.00
		Depth to saturated zone	0.24	Slope	0.63	Depth to saturated zone	0.24
MuB:							
Monongahela---------	50	Somewhat limited		Very limited		Somewhat limited	
		Depth to saturated zone	0.24	Depth to saturated zone	1.00	Slope	0.50
						Depth to saturated zone	0.24
Urban land----------	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela---------	45	Somewhat limited		Very limited		Very limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	1.00
		Depth to saturated zone	0.24	Slope	0.63	Depth to saturated zone	0.24
Urban land----------	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh----------	75	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.16		
SeB:							
Sensabaugh----------	80	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.16	Slope	0.50
Su:							
Sensabaugh----------	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.16		
Urban land----------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh----------	70	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.16	Slope	0.50
Urban land----------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents----------	90	Not rated		Not rated		Not rated	

Table 13a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
VaC:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Shrink-swell	1.00	Shrink-swell	1.00	Slope	1.00
		Slope	0.63	Slope	0.63	Shrink-swell	1.00
				Depth to saturated zone	0.16		
VaD:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.16		
VaE:							
Vandalia------------	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.16		
VsE:							
Vandalia------------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.16		
VuD:							
Vandalia------------	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
				Depth to saturated zone	0.16		
Urban land----------	20	Not rated		Not rated		Not rated	

Table 13b.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin	90	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
Co:							
Cotaco	70	Somewhat limited		Very limited		Somewhat limited	
		Depth to saturated zone	0.75	Depth to saturated zone	1.00	Depth to saturated zone	0.75
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
GaC:							
Gallia	60	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
GpE:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50			Depth to bedrock	0.20
		Depth to hard bedrock	0.20	Slope	1.00		
				Cutbanks cave	0.10		
Peabody	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Shrink-swell	1.00			Depth to bedrock	0.71
		Frost action	0.50	Slope	1.00	Droughty	0.21
		Depth to hard bedrock	0.20	Depth to soft bedrock	0.71		
				Too clayey	0.12		
				Cutbanks cave	0.10		
GsE:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50			Depth to bedrock	0.20
		Depth to hard bedrock	0.20	Slope	1.00		
				Cutbanks cave	0.10		
Peabody	35	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Shrink-swell	1.00			Depth to bedrock	0.71
		Frost action	0.50	Slope	1.00	Droughty	0.21
		Depth to hard bedrock	0.20	Depth to soft bedrock	0.71		
				Too clayey	0.12		
				Cutbanks cave	0.10		
GsF:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50			Depth to bedrock	0.20
		Depth to hard bedrock	0.20	Slope	1.00		
				Cutbanks cave	0.10		

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
GsF:							
Peabody	30	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Shrink-swell	1.00	Slope	1.00	Depth to bedrock	0.71
		Frost action	0.50	Depth to soft bedrock	0.71	Droughty	0.21
		Depth to hard bedrock	0.20	Too clayey	0.12		
				Cutbanks cave	0.10		
GuC:							
Gilpin	40	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Depth to hard bedrock	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63	Depth to bedrock	0.20
		Depth to hard bedrock	0.20	Cutbanks cave	0.10		
Upshur	40	Very limited		Somewhat limited		Somewhat limited	
		Shrink-swell	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.28		
		Frost action	0.50	Cutbanks cave	0.10		
GuD:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.20
		Depth to hard bedrock	0.20	Cutbanks cave	0.10		
Upshur	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.28		
		Frost action	0.50	Cutbanks cave	0.10		
GyD:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Frost action	0.50	Slope	1.00	Depth to bedrock	0.20
		Depth to hard bedrock	0.20	Cutbanks cave	0.10		
Upshur	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.28		
		Frost action	0.50	Cutbanks cave	0.10		
Urban land	20	Not rated		Not rated		Not rated	
Ha:							
Hackers	80	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Cutbanks cave	0.10		
		Shrink-swell	0.50				
		Flooding	0.40				
Ka:							
Kanawha	85	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
Ku:							
Kanawha	65	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
Ku:							
Urban land----------	20	Not rated		Not rated		Not rated	
Me:							
Melvin--------------	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Cutbanks cave	0.10		
		Flooding	0.40				
MoB:							
Monongahela---------	85	Somewhat limited		Very limited		Somewhat limited	
		Frost action	0.50	Depth to saturated zone	1.00	Depth to saturated zone	0.12
		Depth to saturated zone	0.12	Cutbanks cave	0.10		
MoC:							
Monongahela---------	70	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63	Depth to saturated zone	0.12
		Depth to saturated zone	0.12	Cutbanks cave	0.10		
MuB:							
Monongahela---------	50	Somewhat limited		Very limited		Somewhat limited	
		Frost action	0.50	Depth to saturated zone	1.00	Depth to saturated zone	0.12
		Depth to saturated zone	0.12	Cutbanks cave	0.10		
Urban land----------	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela---------	45	Somewhat limited		Very limited		Somewhat limited	
		Slope	0.63	Depth to saturated zone	1.00	Slope	0.63
		Frost action	0.50	Slope	0.63	Depth to saturated zone	0.12
		Depth to saturated zone	0.12	Cutbanks cave	0.10		
Urban land----------	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh----------	75	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
SeB:							
Sensabaugh----------	80	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Depth to saturated zone	0.16		
		Flooding	0.40	Cutbanks cave	0.10		
Su:							
Sensabaugh----------	60	Very limited		Somewhat limited		Somewhat limited	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
Urban land----------	25	Not rated		Not rated		Not rated	

Table 13b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
SuB:							
Sensabaugh----------	70	Somewhat limited		Somewhat limited		Not limited	
		Frost action	0.50	Depth to saturated zone	0.16		
		Flooding	0.40	Cutbanks cave	0.10		
Urban land----------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents----------	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia------------	90	Very limited		Somewhat limited		Somewhat limited	
		Shrink-swell	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Too clayey	0.50		
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
VaD:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50		
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
VaE:							
Vandalia------------	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50		
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
VsE:							
Vandalia------------	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50		
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
VuD:							
Vandalia------------	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	1.00	Too clayey	0.50		
		Frost action	0.50	Depth to saturated zone	0.16		
				Cutbanks cave	0.10		
Urban land----------	20	Not rated		Not rated		Not rated	

Table 14a.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
Ch:					
Chagrin	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.43	Seepage	1.00
Co:					
Cotaco	70	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	0.50	Seepage	0.50
		Flooding	0.40	Flooding	0.40
GaC:					
Gallia	60	Somewhat limited		Very limited	
		Slope	0.63	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
GpE:					
Gilpin	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
Peabody	40	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
GsE:					
Gilpin	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
Peabody	35	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
GsF:					
Gilpin	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GsF:					
Peabody	30	Very limited		Very limited	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
GuC:					
Gilpin	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	0.63	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
Upshur	40	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	0.63	Depth to soft bedrock	0.02
		Depth to bedrock	0.41		
GuD:					
Gilpin	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
Upshur	40	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Depth to soft bedrock	0.02
		Depth to bedrock	0.41		
GyD:					
Gilpin	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
GyD:					
Upshur	30	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Depth to soft bedrock	0.02
		Depth to bedrock	0.41		
Urban land	20	Not rated		Not rated	
Ha:					
Hackers	80	Somewhat limited		Somewhat limited	
		Restricted permeability	0.50	Seepage	0.50
		Flooding	0.40	Flooding	0.40
Ka:					
Kanawha	85	Somewhat limited		Somewhat limited	
		Restricted permeability	0.50	Seepage	0.50
		Flooding	0.40	Flooding	0.40

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ku:					
Kanawha-------------	65	Somewhat limited		Somewhat limited	
		Restricted permeability	0.50	Seepage	0.50
		Flooding	0.40	Flooding	0.40
Urban land----------	20	Not rated		Not rated	
Me:					
Melvin--------------	75	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	0.50	Seepage	0.50
		Flooding	0.40	Flooding	0.40
MoB:					
Monongahela---------	85	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
		Depth to saturated zone	1.00	Depth to saturated zone	0.64
				Seepage	0.50
MoC:					
Monongahela---------	70	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	0.64
		Slope	0.63	Seepage	0.50
MuB:					
Monongahela---------	50	Very limited		Somewhat limited	
		Restricted permeability	1.00	Slope	0.92
		Depth to saturated zone	1.00	Depth to saturated zone	0.64
				Seepage	0.50
Urban land----------	35	Not rated		Not rated	
MuC:					
Monongahela---------	45	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	0.64
		Slope	0.63	Seepage	0.50
Urban land----------	30	Not rated		Not rated	
Se:					
Sensabaugh----------	75	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.43	Seepage	1.00
SeB:					
Sensabaugh----------	80	Somewhat limited		Very limited	
		Depth to saturated zone	0.43	Seepage	1.00
				Slope	0.92
		Flooding	0.40	Flooding	0.40

Table 14a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
Su:					
Sensabaugh----------	60	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.43	Seepage	1.00
Urban land----------	25	Not rated		Not rated	
SuB:					
Sensabaugh----------	70	Somewhat limited		Very limited	
		Depth to saturated zone	0.43	Seepage	1.00
				Slope	0.92
		Flooding	0.40	Flooding	0.40
Urban land----------	15	Not rated		Not rated	
Ud:					
Udorthents----------	90	Not rated		Not rated	
VaC:					
Vandalia------------	90	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	0.63		
		Depth to saturated zone	0.43		
VaD:					
Vandalia------------	90	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
		Depth to saturated zone	0.43		
VaE:					
Vandalia------------	80	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
		Depth to saturated zone	0.43		
VsE:					
Vandalia------------	85	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
		Depth to saturated zone	0.43		
VuD:					
Vandalia------------	70	Very limited		Very limited	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
		Depth to saturated zone	0.43		
Urban land----------	20	Not rated		Not rated	

Table 14b.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin	90	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.21
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		
		Seepage	1.00	Seepage	1.00		
Co:							
Cotaco	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				
GaC:							
Gallia	60	Somewhat limited		Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
GpE:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Peabody	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
GsE:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Peabody	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00
GsF:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Peabody	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	1.00			Too clayey	1.00

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GuC:							
Gilpin	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
Upshur	40	Very limited		Somewhat limited		Very limited	
		Depth to bedrock	1.00	Slope	0.63	Too clayey	1.00
		Too clayey	1.00	Depth to bedrock	0.02	Slope	0.63
		Slope	0.63			Depth to bedrock	0.02
GuD:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Upshur	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	0.02	Too clayey	1.00
		Too clayey	1.00			Depth to bedrock	0.02
GyD:							
Gilpin	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Too clayey	0.50			Too clayey	0.50
Upshur	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	0.02	Too clayey	1.00
		Too clayey	1.00			Depth to bedrock	0.02
Urban land	20	Not rated		Not rated		Not rated	
Ha:							
Hackers	80	Somewhat limited		Somewhat limited		Somewhat limited	
		Flooding	0.40	Flooding	0.40	Too clayey	0.50
Ka:							
Kanawha	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				
Ku:							
Kanawha	65	Somewhat limited		Somewhat limited		Somewhat limited	
		Too clayey	0.50	Flooding	0.40	Too clayey	0.50
		Flooding	0.40				
Urban land	20	Not rated		Not rated		Not rated	
Me:							
Melvin	75	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.40	Flooding	0.40		
MoB:							
Monongahela	85	Very limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.64	Depth to saturated zone	0.80
		Too clayey	0.50			Too clayey	0.50

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MoC:							
Monongahela---------	70	Very limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.64	Depth to saturated zone	0.80
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
MuB:							
Monongahela---------	50	Very limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.64	Depth to saturated zone	0.80
		Too clayey	0.50			Too clayey	0.50
Urban land----------	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela---------	45	Very limited		Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.64	Depth to saturated zone	0.80
		Slope	0.63	Slope	0.63	Slope	0.63
		Too clayey	0.50			Too clayey	0.50
Urban land----------	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh----------	75	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.21
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Gravel content	0.04
		Seepage	1.00	Seepage	1.00		
SeB:							
Sensabaugh----------	80	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.21
						Gravel content	0.04
		Seepage	1.00	Seepage	1.00		
		Flooding	0.40	Flooding	0.40		
Su:							
Sensabaugh----------	60	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Seepage	0.21
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Gravel content	0.04
		Seepage	1.00	Seepage	1.00		
Urban land----------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh----------	70	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.21
						Gravel content	0.04
		Seepage	1.00	Seepage	1.00		
		Flooding	0.40	Flooding	0.40		
Urban land----------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents----------	90	Not rated		Very limited		Not rated	
				Slope	1.00		

Table 14b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
VaC:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00	Slope	0.63	Slope	0.63
		Slope	0.63				
VaD:							
Vandalia------------	90	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00				
VaE:							
Vandalia------------	80	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00				
VsE:							
Vandalia------------	85	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00				
VuD:							
Vandalia------------	70	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00	Too clayey	1.00
		Too clayey	1.00				
Urban land----------	20	Not rated		Not rated		Not rated	

Table 15a.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
Ch:					
Chagrin	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Co:					
Cotaco	70	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GaC:					
Gallia	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GpE:					
Gilpin	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Peabody	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GsE:					
Gilpin	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Peabody	35	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GsF:					
Gilpin	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Peabody	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GuC:					
Gilpin	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Upshur	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Table 15a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
GuD:					
Gilpin--------------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Upshur--------------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
GyD:					
Gilpin--------------	40	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Upshur--------------	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land----------	20	Not rated		Not rated	
Ha:					
Hackers-------------	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Ka:					
Kanawha-------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Ku:					
Kanawha-------------	65	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land----------	20	Not rated		Not rated	
Me:					
Melvin--------------	75	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MoB:					
Monongahela---------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MoC:					
Monongahela---------	70	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
MuB:					
Monongahela---------	50	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land----------	35	Not rated		Not rated	

Table 15a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
MuC:					
Monongahela---------	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land----------	30	Not rated		Not rated	
Se:					
Sensabaugh----------	75	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
SeB:					
Sensabaugh----------	80	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Su:					
Sensabaugh----------	60	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Urban land----------	25	Not rated		Not rated	
SuB:					
Sensabaugh----------	70	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.03
Urban land----------	15	Not rated		Not rated	
Ud:					
Udorthents----------	90	Not rated		Not rated	
VaC:					
Vandalia------------	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
VaD:					
Vandalia------------	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
VaE:					
Vandalia------------	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
VsE:					
Vandalia------------	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
VuD:					
Vandalia------------	70	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Urban land----------	20	Not rated		Not rated	

Table 15b.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
Ch:							
Chagrin	90	Fair		Poor		Fair	
		Low content of organic matter	0.75	Low strength	0.00	Hard to reclaim	0.99
		Too acid	0.84				
Co:							
Cotaco	70	Fair		Poor		Fair	
		Low content of organic matter	0.08	Low strength	0.00	Depth to saturated zone	0.14
		Too acid	0.32	Depth to saturated zone	0.14	Rock fragments	0.88
		Water erosion	0.99				
GaC:							
Gallia	60	Fair		Poor		Fair	
		Too acid	0.32	Low strength	0.00	Slope	0.37
		Low content of organic matter	0.32	Shrink-swell	0.90	Too acid	0.88
		Water erosion	0.99				
GpE:							
Gilpin	40	Fair		Poor		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.00	Slope	0.00
				Slope	0.00	Rock fragments	0.00
		Too acid	0.50	Low strength	0.00	Too acid	0.68
		Droughty	0.65			Depth to bedrock	0.79
		Depth to bedrock	0.79				
Peabody	40	Poor		Poor		Poor	
		Too clayey	0.00	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.03	Slope	0.00	Too clayey	0.00
		Depth to bedrock	0.29	Low strength	0.00	Depth to bedrock	0.29
		Low content of organic matter	0.32	Shrink-swell	0.91	Too acid	0.76
		Too acid	0.50				
		Water erosion	0.90				
GsE:							
Gilpin	50	Fair		Poor		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.00	Slope	0.00
				Low strength	0.00	Rock fragments	0.00
		Too acid	0.50	Slope	0.00	Too clayey	0.31
		Too clayey	0.50			Too acid	0.68
		Droughty	0.65			Depth to bedrock	0.79
		Depth to bedrock	0.79				
Peabody	35	Poor		Poor		Poor	
		Too clayey	0.00	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.03	Low strength	0.00	Too clayey	0.00
		Depth to bedrock	0.29	Slope	0.00	Depth to bedrock	0.29
		Low content of organic matter	0.32	Shrink-swell	0.91	Too acid	0.76
		Too acid	0.50				
		Water erosion	0.90				

Table 15b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
GsF:							
Gilpin	50	Fair		Poor		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Droughty	0.65	Low strength	0.00	Too clayey	0.51
		Depth to bedrock	0.79			Too acid	0.68
		Too clayey	0.82			Depth to bedrock	0.79
Peabody	30	Poor		Poor		Poor	
		Too clayey	0.00	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.03	Slope	0.00	Too clayey	0.00
		Depth to bedrock	0.29	Low strength	0.00	Depth to bedrock	0.29
		Low content of organic matter	0.32	Shrink-swell	0.91	Too acid	0.76
		Too acid	0.50				
		Water erosion	0.90				
GuC:							
Gilpin	40	Fair		Poor		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.00	Rock fragments	0.00
		Too acid	0.50	Low strength	0.00	Slope	0.37
		Droughty	0.65			Too clayey	0.51
		Depth to bedrock	0.79			Too acid	0.68
		Too clayey	0.82			Depth to bedrock	0.79
Upshur	40	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Too acid	0.32	Shrink-swell	0.12	Slope	0.37
		Low content of organic matter	0.32	Depth to bedrock	0.98	Too acid	0.88
		Water erosion	0.90				
GuD:							
Gilpin	40	Fair		Poor		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Low strength	0.00	Rock fragments	0.00
		Droughty	0.65	Slope	0.50	Too clayey	0.51
		Depth to bedrock	0.79			Too acid	0.68
		Too clayey	0.82			Depth to bedrock	0.79
Upshur	40	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Too acid	0.32	Shrink-swell	0.12	Too clayey	0.00
		Low content of organic matter	0.32	Slope	0.50	Too acid	0.88
		Water erosion	0.90	Depth to bedrock	0.98		
GyD:							
Gilpin	40	Fair		Poor		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Low strength	0.00	Rock fragments	0.00
		Droughty	0.65	Slope	0.50	Too clayey	0.51
		Depth to bedrock	0.79			Too acid	0.68
		Too clayey	0.82			Depth to bedrock	0.79

Table 15b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
GyD:							
Upshur	30	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Too acid	0.32	Shrink-swell	0.12	Too clayey	0.00
		Low content of organic matter	0.32	Slope	0.50	Too acid	0.88
				Depth to bedrock	0.98		
		Water erosion	0.90				
Urban land	20	Not rated		Not rated		Not rated	
Ha:							
Hackers	80	Fair		Poor		Fair	
		Low content of organic matter	0.05	Low strength	0.00	Too clayey	0.57
				Shrink-swell	0.98		
		Too acid	0.68				
		Too clayey	0.92				
		Water erosion	0.99				
Ka:							
Kanawha	85	Fair		Poor		Fair	
		Low content of organic matter	0.32	Low strength	0.00	Too clayey	0.31
		Too clayey	0.50				
		Too acid	0.84				
Ku:							
Kanawha	65	Fair		Poor		Fair	
		Low content of organic matter	0.32	Low strength	0.00	Too clayey	0.31
		Too clayey	0.50				
		Too acid	0.84				
Urban land	20	Not rated		Not rated		Not rated	
Me:							
Melvin	75	Fair		Poor		Poor	
		Low content of organic matter	0.18	Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Water erosion	0.90	Low strength	0.00		
		Too acid	0.99				
MoB:							
Monongahela	85	Fair		Poor		Fair	
		Low content of organic matter	0.18	Low strength	0.00	Hard to reclaim	0.50
				Depth to saturated zone	0.62	Depth to saturated zone	0.62
		Too acid	0.54				
		Water erosion	0.90			Too acid	0.98
MoC:							
Monongahela	70	Fair		Poor		Fair	
		Low content of organic matter	0.18	Low strength	0.00	Slope	0.37
				Depth to saturated zone	0.62	Hard to reclaim	0.50
		Too acid	0.54			Depth to saturated zone	0.62
		Water erosion	0.90				
						Too acid	0.98
MuB:							
Monongahela	50	Fair		Poor		Fair	
		Low content of organic matter	0.18	Low strength	0.00	Hard to reclaim	0.50
				Depth to saturated zone	0.62	Depth to saturated zone	0.62
		Too acid	0.54				
		Water erosion	0.90			Too acid	0.98

Table 15b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value	Potential source of topsoil: Rating class and limiting features	Value
MuB:							
Urban land----------	35	Not rated		Not rated		Not rated	
MuC:							
Monongahela---------	45	Fair		Poor		Fair	
		Low content of organic matter	0.18	Low strength	0.00	Slope	0.37
		Too acid	0.54	Depth to saturated zone	0.62	Hard to reclaim	0.50
		Water erosion	0.90			Depth to saturated zone	0.62
						Too acid	0.98
Urban land----------	30	Not rated		Not rated		Not rated	
Se:							
Sensabaugh----------	75	Fair		Poor		Poor	
		Low content of organic matter	0.05	Low strength	0.00	Hard to reclaim	0.00
		Too acid	0.99				
SeB:							
Sensabaugh----------	80	Fair		Poor		Poor	
		Low content of organic matter	0.05	Low strength	0.00	Hard to reclaim	0.00
		Too acid	0.99				
Su:							
Sensabaugh----------	60	Fair		Poor		Poor	
		Low content of organic matter	0.05	Low strength	0.00	Hard to reclaim	0.00
		Too acid	0.99				
Urban land----------	25	Not rated		Not rated		Not rated	
SuB:							
Sensabaugh----------	70	Fair		Poor		Poor	
		Low content of organic matter	0.05	Low strength	0.00	Hard to reclaim	0.00
		Too acid	0.99				
Urban land----------	15	Not rated		Not rated		Not rated	
Ud:							
Udorthents----------	90	Not rated		Not rated		Not rated	
VaC:							
Vandalia------------	90	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Too clayey	0.00
		Low content of organic matter	0.18	Shrink-swell	0.12	Slope	0.37
		Too acid	0.84			Rock fragments	0.72
		Water erosion	0.99				
VaD:							
Vandalia------------	90	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Low content of organic matter	0.18	Shrink-swell	0.12	Too clayey	0.00
		Too acid	0.84	Slope	0.50	Rock fragments	0.72
		Water erosion	0.99				

Table 15b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
VaE:							
Vandalia------------	80	Poor		Poor		Poor	
		Too clayey	0.00	Slope	0.00	Slope	0.00
		Low content of organic matter	0.18	Low strength	0.00	Too clayey	0.00
				Shrink-swell	0.12	Rock fragments	0.72
		Too acid	0.84				
		Water erosion	0.99				
VsE:							
Vandalia------------	85	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Low content of organic matter	0.18	Slope	0.00	Too clayey	0.00
				Shrink-swell	0.12	Rock fragments	0.72
		Too acid	0.84				
		Water erosion	0.99				
VuD:							
Vandalia------------	70	Poor		Poor		Poor	
		Too clayey	0.00	Low strength	0.00	Slope	0.00
		Low content of organic matter	0.18	Shrink-swell	0.12	Too clayey	0.00
				Slope	0.50	Rock fragments	0.72
		Too acid	0.84				
		Water erosion	0.99				
Urban land----------	20	Not rated		Not rated		Not rated	

Table 16.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ch:							
Chagrin	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Piping	1.00	Depth to water	1.00
Co:							
Cotaco	70	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.70	Depth to saturated zone	1.00	Slow refill	0.30
				Piping	1.00	Cutbanks cave	0.10
GaC:							
Gallia	60	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.70	Piping	0.59	Depth to water	1.00
		Slope	0.01				
GpE:							
Gilpin	40	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.77	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.77		
		Slope	0.50				
Peabody	40	Somewhat limited		Not limited		Very limited	
		Depth to bedrock	0.77			Depth to water	1.00
		Slope	0.50				
		Seepage	0.02				
GsE:							
Gilpin	50	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.77	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.77		
		Slope	0.28				
Peabody	35	Somewhat limited		Not limited		Very limited	
		Depth to bedrock	0.77			Depth to water	1.00
		Slope	0.28				
		Seepage	0.02				
GsF:							
Gilpin	50	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Depth to bedrock	0.77	Thin layer	0.77		
		Seepage	0.70				
Peabody	30	Very limited		Not limited		Very limited	
		Slope	1.00			Depth to water	1.00
		Depth to bedrock	0.77				
		Seepage	0.02				
GuC:							
Gilpin	40	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.77	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.77		
		Slope	0.01				

Table 16.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas: Rating class and limiting features	Value	Embankments, dikes, and levees: Rating class and limiting features	Value	Aquifer-fed excavated ponds: Rating class and limiting features	Value
GuC:							
Upshur	40	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.02	Hard to pack	0.16	Depth to water	1.00
		Slope	0.01	Thin layer	0.01		
		Depth to bedrock	0.01				
GuD:							
Gilpin	40	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.77	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.77		
		Slope	0.12				
Upshur	40	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.12	Hard to pack	0.16	Depth to water	1.00
		Seepage	0.02	Thin layer	0.01		
		Depth to bedrock	0.01				
GyD:							
Gilpin	40	Somewhat limited		Very limited		Very limited	
		Depth to bedrock	0.77	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Thin layer	0.77		
		Slope	0.12				
Upshur	30	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.12	Hard to pack	0.16	Depth to water	1.00
		Seepage	0.02	Thin layer	0.01		
		Depth to bedrock	0.01				
Urban land	20	Somewhat limited		Not rated		Not rated	
		Slope	0.12				
Ha:							
Hackers	80	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
Ka:							
Kanawha	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
Ku:							
Kanawha	65	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
Urban land	20	Not limited		Not rated		Not rated	
Me:							
Melvin	75	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.70	Depth to saturated zone	1.00	Cutbanks cave	0.10
				Piping	0.94		
MoB:							
Monongahela	85	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
				Depth to saturated zone	0.99		
MoC:							
Monongahela	70	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
		Slope	0.01	Depth to saturated zone	0.99		

Table 16.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MuB:							
Monongahela----------	50	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
				Depth to saturated zone	0.99		
Urban land----------	35	Not limited		Not rated		Not rated	
MuC:							
Monongahela----------	45	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
		Slope	0.01	Depth to saturated zone	0.99		
Urban land----------	30	Somewhat limited		Not rated		Not rated	
		Slope	0.01				
Se:							
Sensabaugh----------	75	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
SeB:							
Sensabaugh----------	80	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
Su:							
Sensabaugh----------	60	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
Urban land----------	25	Not limited		Not rated		Not rated	
SuB:							
Sensabaugh----------	70	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.03	Depth to water	1.00
Urban land----------	15	Not limited		Not rated		Not rated	
Ud:							
Udorthents----------	90	Somewhat limited		Not rated		Not rated	
		Slope	0.72				
VaC:							
Vandalia------------	90	Somewhat limited		Not limited		Very limited	
		Seepage	0.02			Depth to water	1.00
		Slope	0.01			Slow refill	0.98
VaD:							
Vandalia------------	90	Somewhat limited		Not limited		Very limited	
		Slope	0.12			Depth to water	1.00
		Seepage	0.02			Slow refill	0.98
VaE:							
Vandalia------------	80	Somewhat limited		Not limited		Very limited	
		Slope	0.50			Depth to water	1.00
		Seepage	0.02			Slow refill	0.98
VsE:							
Vandalia------------	85	Somewhat limited		Not limited		Very limited	
		Slope	0.28			Depth to water	1.00
		Seepage	0.02			Slow refill	0.98

Table 16.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
VuD:							
Vandalia------------	70	Somewhat limited		Not limited		Very limited	
		Slope	0.12			Depth to water	1.00
		Seepage	0.02			Slow refill	0.98
Urban land----------	20	Somewhat limited		Not rated		Not rated	
		Slope	0.12				

Table 17.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
Ch:												
Chagrin	0-7	Silt loam	ML	A-4	0	0	100	100	80-100	70-90	20-35	2-10
	7-28	Loam, silt loam, sandy loam	ML, SM, SC-SM	A-4, A-6, A-2-4	0	0	100	100	55-90	30-80	20-40	NP-14
	28-42	Loam, silt loam, sandy loam	ML, SM, SC-SM	A-4, A-6, A-2-4	0	0	100	100	55-90	30-80	20-40	NP-14
	42-50	Loam, silt loam, sandy loam	ML, SM, SC-SM	A-4, A-2-4	0	0	75-100	75-100	40-85	10-80	20-40	NP-10
	50-65	Stratified channery sandy loam to channery loam, channery loam, channery silt loam, channery sandy loam	SM, SC-SM, ML	A-2-4, A-4	0	0	75-100	65-100	40-85	10-80	20-40	NP-10
Co:												
Cotaco	0-7	Silt loam	ML	A-4	0	0	95-100	90-100	55-85	35-80	15-30	NP-7
	7-12	Silt loam	ML, CL-ML	A-4	0	0	95-100	90-100	55-85	35-80	15-30	NP-7
	12-18	Silty clay loam, silt loam, clay loam	CL-ML, CL, ML	A-6, A-4	0	0	90-100	85-100	40-90	20-80	15-35	NP-15
	18-31	Silty clay loam, silt loam, clay loam	CL, CL-ML, ML	A-6, A-4	0	0	90-100	85-100	40-90	20-80	15-35	NP-15
	31-42	Silty clay loam, silt loam, clay loam	CL, CL-ML, ML	A-4, A-6	0	0	90-100	85-100	40-90	20-80	15-35	NP-15
	42-65	Silty clay loam, silt loam	CL, CL-ML, ML	A-4, A-6	0	0	90-100	85-100	40-90	20-80	15-35	NP-15

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
GaC:												
Gallia----------	0-7	Silt loam	ML	A-4	0	0	100	100	75-95	60-85	22-35	3-10
	7-13	Loam, silt loam	ML, CL-ML, CL	A-4	0	0	100	100	75-95	60-85	22-35	3-10
	13-26	Loam, clay loam	CL	A-6	0	0	100	100	60-95	35-70	32-40	13-20
	26-51	Loam, clay loam	CL	A-6	0	0	100	100	60-95	35-70	32-40	13-20
	51-65	Loam, clay loam	CL	A-6	0	0	100	100	60-95	35-70	32-40	13-20
GpE:												
Gilpin----------	0-3	Silt loam	CL-ML, CL	A-4	0	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-10	Silty clay loam, silt loam, loam	CL-ML, CL	A-4, A-6	0	0-5	80-95	75-90	35-85	30-80	20-40	4-15
	10-23	Channery silty clay loam, channery silt loam, channery loam	CL-ML, CL	A-6, A-4	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	23-33	Very channery silty clay loam, very channery silt loam, very channery loam	CL-ML, CL	A-4, A-6	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	33-40	Bedrock			---	---	---	---	---	---	---	---
Peabody---------	0-3	Silt loam	CL-ML, CL	A-4	0	0	85-100	75-100	70-100	60-90	25-35	5-14
	3-7	Silty clay loam, clay, silty clay	CL	A-7	0	0	95-100	75-100	70-100	60-95	35-55	15-30
	7-21	Silty clay loam, clay, silty clay	CL	A-7	0	0	85-100	75-100	70-100	60-95	35-55	15-30
	21-27	Very channery clay, very channery silty clay loam, very channery silty clay	GC	A-7	0	0	50-85	40-75	15-45	15-45	30-55	11-30
	27-33	Bedrock			---	---	---	---	---	---	---	---
	33-40	Bedrock			---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
GsE:												
Gilpin----------	0-3	Silt loam	CL-ML, CL	A-4	0	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-10	Silty clay loam, silt loam, loam	CL-ML, CL	A-4, A-6	0	0-5	80-95	75-90	35-85	30-80	20-40	4-15
	10-23	Channery silty clay loam, channery silt loam, channery loam	CL-ML, CL	A-6, A-4	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	23-33	Very channery silty clay loam, very channery silt loam, very channery loam	CL-ML, CL	A-4, A-6	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	33-40	Bedrock			---	---	---	---	---	---	---	---
Peabody---------	0-3	Silt loam	CL-ML, CL	A-4	0	0	85-100	75-100	70-100	60-90	25-35	5-14
	3-7	Silty clay loam, clay, silty clay	CL	A-7	0	0	95-100	75-100	70-100	60-95	35-55	15-30
	7-21	Silty clay loam, clay, silty clay	CL	A-7	0	0	85-100	75-100	70-100	60-95	35-55	15-30
	21-27	Very channery clay, very channery silty clay loam, very channery silty clay	GC	A-7	0	0	50-85	40-75	15-45	15-45	30-55	11-30
	27-33	Bedrock			---	---	---	---	---	---	---	---
	33-40	Bedrock			---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
GsF:												
Gilpin----------	0-3	Silt loam	CL-ML, CL	A-4	0	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-10	Silty clay loam, silt loam, loam	CL-ML, CL	A-4, A-6	0	0-5	80-95	75-90	35-85	30-80	20-40	4-15
	10-23	Channery silty clay loam, channery silt loam, channery loam	CL-ML, CL	A-6, A-4	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	23-33	Very channery silty clay loam, very channery silt loam, very channery loam	CL-ML, CL	A-4, A-6	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	33-40	Bedrock			---	---	---	---	---	---	---	---
Peabody---------	0-3	Silt loam	CL-ML, CL	A-4	0	0	85-100	75-100	70-100	60-90	25-35	5-14
	3-7	Silty clay loam, clay, silty clay	CL	A-7	0	0	95-100	75-100	70-100	60-95	35-55	15-30
	7-21	Silty clay loam, clay, silty clay	CL	A-7	0	0	85-100	75-100	70-100	60-95	35-55	15-30
	21-27	Very channery clay, very channery silty clay loam, very channery silty clay	GC	A-7	0	0	50-85	40-75	15-45	15-45	30-55	11-30
	27-33	Bedrock			---	---	---	---	---	---	---	---
	33-40	Bedrock			---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
GuC:												
Gilpin----------	0-3	Silt loam	CL-ML, CL	A-4	0	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-10	Silty clay loam, silt loam, loam	CL-ML, CL	A-4, A-6	0	0-5	80-95	75-90	35-85	30-80	20-40	4-15
	10-23	Channery silty clay loam, channery silt loam, channery loam	CL-ML, CL	A-6, A-4	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	23-33	Very channery silty clay loam, very channery silt loam, very channery loam	CL-ML, CL	A-4, A-6	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	33-43	Bedrock			---	---	---	---	---	---	---	---
Upshur----------	0-2	Silt loam	CL-ML, CL	A-4	0	0	95-100	95-100	85-100	65-90	25-40	5-15
	2-6	Silt loam	CL-ML	A-4	0	0	95-100	85-100	85-100	65-90	25-40	5-15
	6-11	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	11-20	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	20-35	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	35-46	Silty clay loam, silty clay, clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	46-57	Silty clay, silty clay loam, clay	CL	A-7	0	0	90-100	85-100	60-100	55-95	35-55	11-25
	57-67	Bedrock			---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GuD:												
Gilpin----------	0-3	Silt loam	CL-ML, CL	A-4	0	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-10	Silty clay loam, silt loam, loam	CL-ML, CL	A-4, A-6	0	0-5	80-95	75-90	35-85	30-80	20-40	4-15
	10-23	Channery silty clay loam, channery silt loam, channery loam	CL-ML, CL	A-6, A-4	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	23-33	Very channery silty clay loam, very channery silt loam, very channery loam	CL-ML, CL	A-4, A-6	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	33-43	Bedrock			---	---	---	---	---	---	---	---
Upshur----------	0-2	Silt loam	CL-ML, CL	A-4	0	0	95-100	95-100	85-100	65-90	25-40	5-15
	2-6	Silt loam	CL-ML	A-4	0	0	95-100	85-100	85-100	65-90	25-40	5-15
	6-11	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	11-20	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	20-35	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	35-46	Silty clay loam, silty clay, clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	46-57	Silty clay, silty clay loam, clay	CL	A-7	0	0	90-100	85-100	60-100	55-95	35-55	11-25
	57-67	Bedrock			---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GyD:												
Gilpin----------	0-3	Silt loam	CL-ML, CL	A-4	0	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	3-10	Silty clay loam, silt loam, loam	CL-ML, CL	A-4, A-6	0	0-5	80-95	75-90	35-85	30-80	20-40	4-15
	10-23	Channery silty clay loam, channery silt loam, channery loam	CL-ML, CL	A-6, A-4	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	23-33	Very channery silty clay loam, very channery silt loam, very channery loam	CL-ML, CL	A-4, A-6	0	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	33-43	Bedrock			---	---	---	---	---	---	---	---
Upshur----------	0-2	Silt loam	CL-ML, CL	A-4	0	0	95-100	95-100	85-100	65-90	25-40	5-15
	2-6	Silt loam	CL-ML	A-4	0	0	95-100	85-100	85-100	65-90	25-40	5-15
	6-11	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	11-20	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	20-35	Clay, silty clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	35-46	Silty clay loam, silty clay, clay	CL	A-7	0	0	95-100	85-100	80-100	75-100	45-70	20-40
	46-57	Silty clay, silty clay loam, clay	CL	A-7	0	0	90-100	85-100	60-100	55-95	35-55	11-25
	57-67	Bedrock			---	---	---	---	---	---	---	---
Urban land------	---	---	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Ha:												
Hackers---------	0-8	Silt loam	ML	A-4	0	0	90-100	90-100	75-100	60-90	20-35	3-12
	8-22	Silt loam, silty clay loam	CL, CL-ML	A-6, A-4	0	0	90-100	90-100	90-100	75-95	25-40	4-18
	22-38	Silt loam, silty clay loam	CL, CL-ML	A-6, A-4	0	0	90-100	90-100	90-100	75-95	25-40	4-18
	38-44	Silt loam, silty clay loam	CL-ML, CL	A-4, A-6	0	0	90-100	90-100	90-100	75-95	25-40	4-18
	44-65	Silt loam	CL-ML, CL, ML	A-4, A-6	0	0	90-100	90-100	75-95	60-85	20-40	1-15
Ka:												
Kanawha---------	0-4	Loam	ML	A-4	0	0	100	100	65-100	50-90	20-35	2-10
	4-9	Loam	ML	A-4	0	0	100	100	65-100	50-90	20-35	2-10
	9-14	Loam, silt loam	ML, CL-ML, CL	A-4, A-6	0	0	100	100	50-100	30-90	20-35	2-12
	14-24	Loam, silt loam, clay loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15
	24-40	Loam, silt loam, clay loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15
	40-54	Loam, silt loam, clay loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15
	54-65	Loam	ML, CL-ML, CL	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15
Ku:												
Kanawha---------	0-4	Loam	ML	A-4	0	0	100	100	65-100	50-90	20-35	2-10
	4-9	Loam	ML	A-4	0	0	100	100	65-100	50-90	20-35	2-10
	9-14	Loam, silt loam	ML, CL-ML, CL	A-4, A-6	0	0	100	100	50-100	30-90	20-35	2-12
	14-24	Loam, silt loam, clay loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15
	24-40	Loam, silt loam, clay loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15
	40-54	Loam, silt loam, clay loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15
	54-65	Loam	ML, CL-ML, CL	A-4, A-6	0	0	100	100	60-100	25-80	20-40	3-15

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
Ku:												
Urban land------	---	---	---	---	---	---	---	---	---	---	---	---
Me:												
Melvin----------	0-4	Silt loam	ML	A-4	0	0	95-100	90-100	80-100	80-95	25-35	4-10
	4-9	Silt loam	ML	A-4	0	0	95-100	90-100	80-100	80-95	25-35	4-10
	9-36	Silt loam, silty clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-100	80-98	25-40	5-20
	36-65	Silty clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	75-100	70-100	70-100	60-98	25-40	5-20
MoB:												
Monongahela-----	0-8	Silt loam	ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	8-12	Silt loam	ML, CL-ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	12-22	Silty clay loam, loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	75-100	70-90	20-40	5-15
	22-33	Clay loam, loam, silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	55-95	45-95	20-40	3-15
	33-51	Clay loam, loam, silt loam	CL-ML, CL, ML	A-6, A-4	0	0	100	100	55-95	45-95	20-40	1-15
	51-65	Channery clay loam, channery loam	CL-ML, CL, ML	A-6, A-4	0	0-20	75-100	70-90	60-85	40-85	20-40	1-15
MoC:												
Monongahela-----	0-8	Silt loam	ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	8-12	Silt loam	ML, CL-ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	12-22	Silty clay loam, loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	75-100	70-90	20-40	5-15
	22-33	Clay loam, loam, silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	55-95	45-95	20-40	3-15
	33-51	Clay loam, loam, silt loam	CL-ML, CL, ML	A-6, A-4	0	0	100	100	55-95	45-95	20-40	1-15
	51-65	Channery clay loam, channery loam	CL-ML, CL, ML	A-6, A-4	0	0-20	75-100	70-90	60-85	40-85	20-40	1-15

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
MuB:												
Monongahela-----	0-8	Silt loam	ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	8-12	Silt loam	ML, CL-ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	12-22	Silty clay loam, loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	75-100	70-90	20-40	5-15
	22-33	Clay loam, loam, silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	55-95	45-95	20-40	3-15
	33-51	Clay loam, loam, silt loam	CL-ML, CL, ML	A-6, A-4	0	0	100	100	55-95	45-95	20-40	1-15
	51-65	Channery clay loam, channery loam	CL-ML, CL, ML	A-6, A-4	0	0-20	75-100	70-90	60-85	40-85	20-40	1-15
Urban land------	---	---	---	---	---	---	---	---	---	---	---	---
MuC:												
Monongahela-----	0-8	Silt loam	ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	8-12	Silt loam	ML, CL-ML	A-4	0	0	100	100	75-100	45-90	20-35	1-10
	12-22	Silty clay loam, loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	75-100	70-90	20-40	5-15
	22-33	Clay loam, loam, silt loam	CL-ML, CL, ML	A-4, A-6	0	0	100	100	55-95	45-95	20-40	3-15
	33-51	Clay loam, loam, silt loam	CL-ML, CL, ML	A-6, A-4	0	0	100	100	55-95	45-95	20-40	1-15
	51-65	Channery clay loam, channery loam	CL-ML, CL, ML	A-6, A-4	0	0-20	75-100	70-90	60-85	40-85	20-40	1-15
Urban land------	---	---	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
Se:												
Sensabaugh------	0-6	Silt loam	ML	A-4	0	0-5	90-100	85-100	65-85	55-75	16-29	3-9
	6-19	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	85-95	80-90	45-75	35-65	20-35	5-14
	19-25	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	50-95	45-90	40-75	35-65	20-35	5-14
	25-30	Channery loam, channery silt loam, channery sandy loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	5-25	50-90	45-90	35-65	35-55	22-36	6-15
	30-39	Very channery sandy loam, very channery loam, very channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	39-49	Extremely channery sandy loam, extremely channery loam, extremely channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	49-65	Channery sandy loam, channery loam, channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SeB:												
Sensabaugh------	0-6	Silt loam	ML	A-4	0	0-5	90-100	85-100	65-85	55-75	16-29	3-9
	6-19	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	85-95	80-90	45-75	35-65	20-35	5-14
	19-25	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	50-95	45-90	40-75	35-65	20-35	5-14
	25-30	Channery loam, channery silt loam, channery sandy loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	5-25	50-90	45-90	35-80	35-55	22-36	6-15
	30-39	Very channery sandy loam, very channery loam, very channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	39-49	Extremely channery sandy loam, extremely channery loam, extremely channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	49-65	Channery sandy loam, channery loam, channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Su:												
Sensabaugh------	0-6	Silt loam	ML	A-4	0	0-5	90-100	85-100	65-85	55-75	16-29	3-9
	6-19	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	85-95	80-90	45-75	35-65	20-35	5-14
	19-25	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	50-95	45-90	40-75	35-65	20-35	5-14
	25-30	Channery loam, channery silt loam, channery sandy loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	5-25	50-90	45-90	35-80	35-55	22-36	6-15
	30-39	Very channery sandy loam, very channery loam, very channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	39-49	Extremely channery sandy loam, extremely channery loam, extremely channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	49-65	Channery sandy loam, channery loam, channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
Urban land------	---	---	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SuB:												
Sensabaugh------	0-6	Silt loam	ML	A-4	0	0-5	90-100	85-100	65-85	55-75	16-29	3-9
	6-19	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	85-95	80-90	45-75	35-65	20-35	5-14
	19-25	Silt loam, loam, sandy loam, silty clay loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	2-8	50-95	45-90	40-75	35-65	20-35	5-14
	25-30	Channery loam, channery silt loam, channery sandy loam	CL-ML, CL, SC-SM, SC	A-4, A-6	0	5-25	50-90	45-90	35-65	35-55	22-36	6-15
	30-39	Very channery sandy loam, very channery loam, very channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	39-49	Extremely channery sandy loam, extremely channery loam, extremely channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
	49-65	Channery sandy loam, channery loam, channery silt loam	SC-SM, SC, CL-ML, CL	A-2-4, A-4, A-6	0	5-30	55-90	25-75	25-65	20-55	20-36	6-15
Urban land------	---	---	---	---	---	---	---	---	---	---	---	---
Ud:												
Udorthents------	---	---	---	---	---	---	---	---	---	---	---	---

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
VaC:												
Vandalia--------	0-6	Silt loam	CL-ML, CL	A-4	0	0-5	80-100	80-95	70-95	50-90	25-45	5-20
	6-10	Channery silt loam, channery silty clay loam	CL-ML, CL	A-7, A-6, A-4	0	0-5	80-100	70-100	65-95	50-90	25-45	5-20
	10-17	Channery silty clay loam, channery clay, channery silty clay, channery silt loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	17-24	Silty clay loam, clay, silty clay	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	24-33	Clay, silty clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	33-60	Silty clay, clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	60-65	Channery clay, channery silty clay	CL	A-7	0	0-5	50-95	45-90	40-85	35-80	30-55	10-30

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
VaD:												
Vandalia--------	0-6	Silt loam	CL-ML, CL	A-4	0	0-5	80-100	80-100	70-95	50-90	25-45	5-20
	6-10	Channery silt loam, channery silty clay loam	CL-ML, CL	A-7, A-6, A-4	0	0-5	80-100	70-100	65-95	50-90	25-45	5-20
	10-17	Channery silty clay loam, channery clay, channery silty clay, channery silt loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	17-24	Silty clay loam, clay, silty clay	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	24-33	Clay, silty clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	33-60	Silty clay, clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	60-65	Channery clay, channery silty clay	CL	A-7	0	0-5	50-95	45-90	40-85	35-80	30-55	10-30

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
VaE:												
Vandalia--------	0-6	Silt loam	CL-ML, CL	A-4	0	0-5	80-100	80-100	70-95	50-90	25-45	5-20
	6-10	Channery silt loam, channery silty clay loam	CL-ML, CL	A-7, A-6, A-4	0	0-5	80-100	70-100	65-95	50-90	25-45	5-20
	10-17	Channery silty clay loam, channery clay, channery silty clay, channery silt loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	17-24	Silty clay loam, clay, silty clay	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	24-33	Clay, silty clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	33-60	Silty clay, clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	60-65	Channery clay, channery silty clay	CL	A-7	0	0-5	50-95	45-90	40-85	35-80	30-55	10-30

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
VsE:												
Vandalia--------	0-6	Silt loam	CL-ML, CL	A-4	0	0-5	80-100	80-100	70-95	50-90	25-45	5-20
	6-10	Channery silt loam, channery silty clay loam	CL-ML, CL	A-7, A-6, A-4	0	0-5	80-100	70-100	65-95	50-90	25-45	5-20
	10-17	Channery silty clay loam, channery clay, channery silty clay, channery silt loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	17-24	Silty clay loam, clay, silty clay	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	24-33	Clay, silty clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	33-60	Silty clay, clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	60-65	Channery clay, channery silty clay	CL	A-7	0	0-5	50-95	45-90	40-85	35-80	30-55	10-30

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
VuD:												
Vandalia--------	0-6	Silt loam	CL-ML, CL	A-4	0	0-5	80-100	80-100	70-95	50-90	25-45	5-20
	6-10	Channery silt loam, channery silty clay loam	CL-ML, CL	A-7, A-6, A-4	0	0-5	80-100	70-100	65-95	50-90	25-45	5-20
	10-17	Channery silty clay loam, channery clay, channery silty clay, channery silt loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	17-24	Silty clay loam, clay, silty clay	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	24-33	Clay, silty clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	33-60	Silty clay, clay, silty clay loam	CL	A-7, A-6	0	0-5	60-100	55-95	50-90	45-85	35-55	15-30
	60-65	Channery clay, channery silty clay	CL	A-7	0	0-5	50-95	45-90	40-85	35-80	30-55	10-30
Urban land------	---	---	---	---	---	---	---	---	---	---	---	---

Table 18.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors		
										Kw	Kf	T
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct			
Ch:												
Chagrin------------	0-7	15-35	30-60	10-27	1.20-1.40	0.6-6	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	5
	7-28	35-60	30-60	18-27	1.20-1.50	0.6-6	0.14-0.20	0.0-2.9	0.5-0.8	.32	.37	
	28-42	35-60	30-60	18-27	1.20-1.50	0.6-6	0.14-0.20	0.0-2.9	0.2-0.6	.32	.37	
	42-50	35-60	30-60	5-25	1.20-1.40	0.6-6	0.08-0.20	0.0-2.9	0.1-0.2	.32	.43	
	50-65	45-70	15-55	5-25	1.20-1.40	0.6-6	0.08-0.20	0.0-2.9	0.1-0.2	.32	.43	
Co:												
Cotaco-------------	0-7	15-35	40-55	7-27	1.20-1.40	0.6-6	0.12-0.20	0.0-2.9	1.0-3.0	.37	.43	3
	7-12	15-35	40-55	7-27	1.20-1.40	0.6-2	0.12-0.20	0.0-2.9	0.5-0.7	.37	.43	
	12-18	15-25	40-55	18-35	1.20-1.50	0.6-2	0.07-0.15	0.0-2.9	0.2-0.6	.28	.32	
	18-31	15-25	40-55	18-35	1.20-1.50	0.6-2	0.07-0.15	0.0-2.9	0.2-0.6	.28	.32	
	31-42	15-25	40-55	18-35	1.20-1.50	0.6-2	0.07-0.15	0.0-2.9	0.2-0.6	.28	.32	
	42-65	15-25	40-55	18-35	1.20-1.50	0.6-2	0.07-0.15	0.0-2.9	0.1-0.3	.28	.32	
GaC:												
Gallia-------------	0-7	20-35	40-60	10-22	1.30-1.50	0.6-6	0.18-0.23	0.0-2.9	1.0-3.0	.37	.37	5
	7-13	20-35	40-60	10-22	1.30-1.50	0.6-2	0.18-0.23	0.0-2.9	0.5-1.0	.37	.37	
	13-26	25-45	30-50	18-35	1.20-1.60	0.6-2	0.12-0.18	3.0-5.9	0.2-0.6	.37	.49	
	26-51	25-45	30-50	18-35	1.20-1.60	0.6-2	0.12-0.18	3.0-5.9	0.2-0.6	.37	.49	
	51-65	25-45	30-50	18-35	1.20-1.60	0.6-2	0.12-0.18	3.0-5.9	0.1-0.2	.37	.49	
GpE:												
Gilpin-------------	0-3	10-30	40-55	15-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	1.0-3.0	.32	.43	3
	3-10	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	10-23	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	23-33	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.1-0.2	.24	.49	
	33-40	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	
Peabody------------	0-3	10-30	30-55	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	1.0-3.0	.43	.43	3
	3-7	5-30	25-55	35-50	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	7-21	10-30	25-55	35-50	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	21-27	5-35	25-55	27-50	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.1-0.2	.32	.64	
	27-33	---	---	---	---	0.0015-0.06	---	---	0.0-0.0	---	---	
	33-40	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	
GsE:												
Gilpin-------------	0-3	10-30	40-55	15-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	1.0-3.0	.32	.43	3
	3-10	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	10-23	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	23-33	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.1-0.2	.24	.49	
	33-40	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct			
GsE:												
Peabody------------	0-3	10-30	30-55	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	1.0-3.0	.43	.43	3
	3-7	5-30	25-55	35-50	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	7-21	10-30	25-55	35-50	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	21-27	5-35	25-55	27-50	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.1-0.2	.32	.64	
	27-33	---	---	---	---	0.0015-0.06	---	---	0.0-0.0	---	---	
	33-40	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	
GsF:												
Gilpin-------------	0-3	10-30	40-55	15-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	1.0-3.0	.32	.43	3
	3-10	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	10-23	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	23-33	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.1-0.2	.24	.49	
	33-40	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	
GsF:												
Peabody------------	0-3	10-30	30-55	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	1.0-3.0	.43	.43	3
	3-7	5-30	25-55	35-50	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	7-21	10-30	25-55	35-50	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	21-27	5-35	25-55	27-50	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.1-0.2	.32	.64	
	27-33	---	---	---	---	0.0015-0.06	---	---	0.0-0.0	---	---	
	33-40	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	
GuC:												
Gilpin-------------	0-3	10-30	40-55	15-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	1.0-3.0	.32	.43	3
	3-10	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	10-23	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	23-33	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.1-0.2	.24	.49	
	33-43	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	
Upshur-------------	0-2	10-30	40-60	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	1.0-3.0	.43	.43	3
	2-6	10-30	40-60	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	0.5-1.0	.37	.37	
	6-11	5-30	25-50	40-55	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	11-20	10-25	25-50	40-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	20-35	10-25	25-50	40-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	35-46	10-25	25-50	35-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.4	.32	.32	
	46-57	5-25	30-60	27-45	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.37	
	57-67	---	---	---	---	0.0015-0.06	---	---	0.0-0.0	---	---	
GuD:												
Gilpin-------------	0-3	10-30	40-55	15-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	1.0-3.0	.32	.43	3
	3-10	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	10-23	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	23-33	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.1-0.2	.24	.49	
	33-43	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors		
										Kw	Kf	T
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct			
GuD:												
Upshur-------------	0-2	10-30	40-60	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	1.0-3.0	.43	.43	3
	2-6	10-30	40-60	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	0.5-1.0	.37	.37	
	6-11	5-30	25-50	40-55	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	11-20	10-25	25-50	40-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	20-35	10-25	25-50	40-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	35-46	10-25	25-50	35-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.4	.32	.32	
	46-57	5-25	30-60	27-45	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.37	
	57-67	---	---	---	---	0.0015-0.06	---	---	0.0-0.0	---	---	
GyD:												
Gilpin-------------	0-3	10-30	40-55	15-27	1.20-1.40	0.6-2	0.12-0.18	0.0-2.9	1.0-3.0	.32	.43	3
	3-10	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	10-23	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.2-0.6	.24	.49	
	23-33	10-25	40-55	18-35	1.20-1.50	0.6-2	0.12-0.16	0.0-2.9	0.1-0.2	.24	.49	
	33-43	---	---	---	---	0.0000-0.0015	---	---	0.0-0.0	---	---	
Upshur-------------	0-2	10-30	40-60	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	1.0-3.0	.43	.43	3
	2-6	10-30	40-60	15-27	1.20-1.40	0.6-2	0.12-0.16	3.0-5.9	0.5-1.0	.37	.37	
	6-11	5-30	25-50	40-55	1.30-1.60	0.06-0.6	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	11-20	10-25	25-50	40-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	20-35	10-25	25-50	40-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.6	.32	.32	
	35-46	10-25	25-50	35-55	1.30-1.60	0.06-0.2	0.10-0.14	6.0-8.9	0.2-0.4	.32	.32	
	46-57	5-25	30-60	27-45	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.37	
	57-67	---	---	---	---	0.0015-0.06	---	---	0.0-0.0	---	---	
Urban land---------	---	---	---	---	---	---	---	---	---	---	---	--
Ha:												
Hackers------------	0-8	5-15	55-75	15-27	1.20-1.40	0.6-6	0.18-0.24	0.0-2.9	1.0-3.0	.32	.32	4
	8-22	0-15	55-75	18-35	1.30-1.50	0.6-2	0.12-0.18	3.0-5.9	0.2-0.6	.37	.37	
	22-38	5-15	55-75	18-35	1.30-1.50	0.6-2	0.12-0.18	3.0-5.9	0.2-0.6	.37	.37	
	38-44	5-15	55-75	18-35	1.30-1.50	0.6-2	0.12-0.18	3.0-5.9	0.2-0.4	.37	.37	
	44-65	5-15	55-75	18-27	1.30-1.50	0.6-2	0.12-0.18	0.0-2.9	0.1-0.2	.28	.37	
Ka:												
Kanawha------------	0-4	35-55	35-60	10-20	1.20-1.40	0.6-6	0.16-0.22	0.0-2.9	2.0-4.0	.32	.37	4
	4-9	35-55	35-60	10-20	1.20-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-2.0	.32	.37	
	9-14	35-55	35-60	10-25	1.30-1.50	0.6-2	0.12-0.20	0.0-2.9	0.5-1.0	.32	.37	
	14-24	35-55	35-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.28	.32	
	24-40	0-52	15-83	18-40	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.28	.32	
	40-54	35-55	35-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.4	.28	.32	
	54-65	35-55	35-60	18-27	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.1-0.2	.28	.32	

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors		
										Kw	Kf	T
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct			
Ku:												
Kanawha------------	0-4	35-55	35-60	10-20	1.20-1.40	0.6-6	0.16-0.22	0.0-2.9	2.0-4.0	.32	.37	4
	4-9	35-55	35-60	10-20	1.20-1.40	0.6-2	0.16-0.22	0.0-2.9	1.0-2.0	.32	.37	
	9-14	35-55	35-60	10-25	1.30-1.50	0.6-2	0.12-0.20	0.0-2.9	0.5-1.0	.32	.37	
	14-24	35-55	35-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.28	.32	
	24-40	0-52	15-83	18-40	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.28	.32	
	40-54	35-55	35-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.4	.28	.32	
	54-65	35-55	35-60	18-27	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.1-0.2	.28	.32	
Urban land---------	---	---	---	---	---	---	---	---	---	---	---	--
Me:												
Melvin-------------	0-4	5-20	60-75	12-17	1.20-1.60	0.6-6	0.18-0.23	0.0-2.9	2.0-4.0	.43	.43	5
	4-9	5-20	60-75	12-17	1.20-1.60	0.6-2	0.18-0.23	0.0-2.9	1.0-2.0	.43	.43	
	9-36	5-20	60-75	12-35	1.30-1.60	0.6-2	0.18-0.23	0.0-2.9	0.5-0.7	.43	.43	
	36-65	5-20	60-75	7-35	1.40-1.70	0.6-2	0.16-0.23	0.0-2.9	0.2-0.4	.43	.43	
MoB:												
Monongahela--------	0-8	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	1.0-3.0	.43	.43	3
	8-12	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	0.5-0.8	.43	.43	
	12-22	15-35	40-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.43	.43	
	22-33	15-35	40-60	18-35	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	33-51	0-52	15-83	18-40	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	51-65	20-52	0-53	10-40	1.20-1.40	0.2-0.6	0.08-0.12	0.0-2.9	0.1-0.2	.37	.55	
MoC:												
Monongahela--------	0-8	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	1.0-3.0	.43	.43	3
	8-12	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	0.5-0.8	.43	.43	
	12-22	15-35	40-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.43	.43	
	22-33	15-35	40-60	18-35	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	33-51	0-52	15-83	18-40	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	51-65	20-52	0-53	10-40	1.20-1.40	0.2-0.6	0.08-0.12	0.0-2.9	0.1-0.2	.37	.55	
MuB:												
Monongahela--------	0-8	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	1.0-3.0	.43	.43	3
	8-12	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	0.5-0.8	.43	.43	
	12-22	15-35	40-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.43	.43	
	22-33	15-35	40-60	18-35	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	33-51	0-52	15-83	18-40	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	51-65	20-52	0-53	10-40	1.20-1.40	0.2-0.6	0.08-0.12	0.0-2.9	0.1-0.2	.37	.55	
Urban land---------	---	---	---	---	---	---	---	---	---	---	---	--

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors		
										Kw	Kf	T
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct			
MuC:												
Monongahela--------	0-8	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	1.0-3.0	.43	.43	3
	8-12	15-35	40-60	10-27	1.20-1.40	0.6-2	0.18-0.24	0.0-2.9	0.5-0.8	.43	.43	
	12-22	15-35	40-60	18-35	1.30-1.50	0.6-2	0.14-0.18	0.0-2.9	0.2-0.6	.43	.43	
	22-33	15-35	40-60	18-35	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	33-51	0-52	15-83	18-40	1.30-1.60	0.06-0.2	0.08-0.12	0.0-2.9	0.2-0.4	.43	.49	
	51-65	20-52	0-53	10-40	1.20-1.40	0.2-0.6	0.08-0.12	0.0-2.9	0.1-0.2	.37	.55	
Urban land---------	---	---	---	---	---	---	---	---	---	---	---	--
Se:												
Sensabaugh---------	0-6	15-60	30-60	8-25	1.25-1.40	0.6-6	0.12-0.18	0.0-2.9	1.0-3.0	.24	.24	5
	6-19	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.5-0.7	.20	.24	
	19-25	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.2-0.6	.20	.24	
	25-30	35-60	30-60	12-27	1.30-1.50	0.6-6	0.10-0.15	0.0-2.9	0.2-0.6	.17	.24	
	30-39	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.2-0.4	.17	.20	
	39-49	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
	49-65	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
SeB:												
Sensabaugh---------	0-6	15-60	30-60	8-25	1.25-1.40	0.6-6	0.12-0.18	0.0-2.9	1.0-3.0	.24	.24	5
	6-19	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.5-0.7	.20	.24	
	19-25	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.2-0.6	.20	.24	
	25-30	35-60	30-60	12-27	1.30-1.50	0.6-6	0.10-0.15	0.0-2.9	0.2-0.6	.17	.24	
	30-39	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.2-0.4	.17	.20	
	39-49	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
	49-65	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
Su:												
Sensabaugh---------	0-6	15-60	30-60	8-25	1.25-1.40	0.6-6	0.12-0.18	0.0-2.9	1.0-3.0	.24	.24	5
	6-19	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.5-0.7	.20	.24	
	19-25	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.2-0.6	.20	.24	
	25-30	35-60	30-60	12-27	1.30-1.50	0.6-6	0.10-0.15	0.0-2.9	0.2-0.6	.17	.24	
	30-39	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.2-0.4	.17	.20	
	39-49	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
	49-65	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
Urban land---------	---	---	---	---	---	---	---	---	---	---	---	--

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct			
SuB:												
Sensabaugh---------	0-6	15-60	30-60	8-25	1.25-1.40	0.6-6	0.12-0.18	0.0-2.9	1.0-3.0	.24	.24	5
	6-19	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.5-0.7	.20	.24	
	19-25	15-60	30-60	18-35	1.30-1.50	0.6-6	0.10-0.16	0.0-2.9	0.2-0.6	.20	.24	
	25-30	35-60	30-60	12-27	1.30-1.50	0.6-6	0.10-0.15	0.0-2.9	0.2-0.6	.17	.24	
	30-39	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.2-0.4	.17	.20	
	39-49	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
	49-65	0-85	0-83	12-27	1.25-1.50	0.6-6	0.08-0.14	0.0-2.9	0.1-0.2	.17	.20	
Urban land---------	---	---	---	---	---	---	---	---	---	---	---	--
Ud:												
Udorthents---------	---	---	---	---	---	---	---	---	---	---	---	--
VaC:												
Vandalia-----------	0-6	10-50	50-88	12-27	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	1.0-3.0	.37	.43	4
	6-10	10-30	45-60	20-35	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	0.5-0.7	.37	.43	
	10-17	5-30	30-60	20-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	17-24	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	24-33	10-30	25-60	35-50	1.30-1.60	0.06-0.2	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	33-60	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.4	.32	.43	
	60-65	5-45	15-60	40-80	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.43	
VaD:												
Vandalia-----------	0-6	10-50	50-88	12-27	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	1.0-3.0	.37	.43	4
	6-10	10-30	45-60	20-35	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	0.5-0.7	.37	.43	
	10-17	5-30	30-60	20-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	17-24	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	24-33	10-30	25-60	35-50	1.30-1.60	0.06-0.2	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	33-60	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.4	.32	.43	
	60-65	5-45	15-60	40-80	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.43	
VaE:												
Vandalia-----------	0-6	10-50	50-88	12-27	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	1.0-3.0	.37	.43	4
	6-10	10-30	45-60	20-35	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	0.5-0.7	.37	.43	
	10-17	5-30	30-60	20-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	17-24	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	24-33	10-30	25-60	35-50	1.30-1.60	0.06-0.2	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	33-60	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.4	.32	.43	
	60-65	5-45	15-60	40-80	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.43	

Table 18.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (K_{sat})	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors		
										Kw	Kf	T
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct			
VsE:												
Vandalia-----------	0-6	10-50	50-88	12-27	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	1.0-3.0	.37	.43	4
	6-10	10-30	45-60	20-35	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	0.5-0.7	.37	.43	
	10-17	5-30	30-60	20-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	17-24	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	24-33	10-30	25-60	35-50	1.30-1.60	0.06-0.2	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	33-60	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.4	.32	.43	
	60-65	5-45	15-60	40-80	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.43	
VuD:												
Vandalia-----------	0-6	10-50	50-88	12-27	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	1.0-3.0	.37	.43	4
	6-10	10-30	45-60	20-35	1.20-1.50	0.6-2	0.12-0.18	3.0-5.9	0.5-0.7	.37	.43	
	10-17	5-30	30-60	20-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	17-24	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	24-33	10-30	25-60	35-50	1.30-1.60	0.06-0.2	0.12-0.15	6.0-8.9	0.2-0.6	.32	.43	
	33-60	5-30	30-60	35-50	1.30-1.60	0.06-0.6	0.12-0.15	6.0-8.9	0.2-0.4	.32	.43	
	60-65	5-45	15-60	40-80	1.30-1.60	0.06-0.6	0.08-0.12	6.0-8.9	0.1-0.2	.32	.43	
Urban land---------	---	---	---	---	---	---	---	---	---	---	---	--

Table 19.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
Ch:				
Chagrin--------------	0-7	10-23	8.0-17	5.6-7.0
	7-28	9.0-15	7.0-11	5.8-7.0
	28-42	9.0-15	7.0-11	5.8-7.0
	42-50	3.0-13	2.0-10	5.8-7.0
	50-65	3.0-13	2.0-10	5.8-7.0
Co:				
Cotaco---------------	0-7	3.0-18	2.0-14	3.6-6.3
	7-12	2.0-9.0	2.0-7.0	3.6-6.5
	12-18	6.0-11	5.0-8.0	3.6-6.5
	18-31	6.0-11	5.0-8.0	3.6-5.5
	31-42	6.0-11	5.0-8.0	3.6-5.5
	42-65	6.0-11	5.0-8.0	3.6-5.5
GaC:				
Gallia---------------	0-7	7.0-18	5.0-14	5.6-7.0
	7-13	5.0-11	4.0-8.0	4.5-6.0
	13-26	9.0-18	7.0-14	4.5-6.0
	26-51	9.0-18	7.0-14	4.5-6.0
	51-65	9.0-18	7.0-14	4.5-6.0
GpE:				
Gilpin---------------	0-3	6.0-18	5.0-14	4.5-5.5
	3-10	6.0-11	5.0-8.0	4.5-5.5
	10-23	6.0-11	5.0-8.0	4.5-5.5
	23-33	6.0-11	5.0-8.0	4.5-5.5
	33-40	---	---	---
Peabody--------------	0-3	10-23	8.0-17	4.5-6.0
	3-7	18-25	14-19	4.5-6.3
	7-21	18-25	14-19	4.5-6.3
	21-27	14-25	11-19	4.5-6.0
	27-33	---	---	---
	33-40	---	---	---
GsE:				
Gilpin---------------	0-3	6.0-18	5.0-14	4.5-5.5
	3-10	6.0-11	5.0-8.0	4.5-5.5
	10-23	6.0-11	5.0-8.0	4.5-5.5
	23-33	6.0-11	5.0-8.0	4.5-5.5
	33-40	---	---	---
Peabody--------------	0-3	10-23	8.0-17	4.5-6.0
	3-7	18-25	14-19	4.5-6.3
	7-21	18-25	14-19	4.5-6.3
	21-27	14-25	11-19	4.5-6.0
	27-33	---	---	---
	33-40	---	---	---
GsF:				
Gilpin---------------	0-3	6.0-18	5.0-14	4.5-5.5
	3-10	6.0-11	5.0-8.0	4.5-5.5
	10-23	6.0-11	5.0-8.0	4.5-5.5
	23-33	6.0-11	5.0-8.0	4.5-5.5
	33-40	---	---	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
GsF:				
Peabody--------------	0-3	10-23	8.0-17	4.5-6.0
	3-7	18-25	14-19	4.5-6.3
	7-21	18-25	14-19	4.5-6.3
	21-27	14-25	11-19	4.5-6.0
	27-33	---	---	---
	33-40	---	---	---
GuC:				
Gilpin---------------	0-3	6.0-18	5.0-14	4.5-5.5
	3-10	6.0-11	5.0-8.0	4.5-5.5
	10-23	6.0-11	5.0-8.0	4.5-5.5
	23-33	6.0-11	5.0-8.0	4.5-5.5
	33-43	---	---	---
Upshur---------------	0-2	13-28	10-21	4.5-6.5
	2-6	11-19	8.0-14	4.5-6.5
	6-11	28-39	21-29	4.5-5.5
	11-20	28-39	21-29	4.5-5.5
	20-35	28-39	21-29	4.5-5.5
	35-46	28-39	21-29	4.5-6.0
	46-57	19-32	14-24	4.5-6.0
	57-67	---	---	---
GuD:				
Gilpin---------------	0-3	6.0-18	5.0-14	4.5-5.5
	3-10	6.0-11	5.0-8.0	4.5-5.5
	10-23	6.0-11	5.0-8.0	4.5-5.5
	23-33	6.0-11	5.0-8.0	4.5-5.5
	33-43	---	---	---
Upshur---------------	0-2	13-28	10-21	4.5-6.5
	2-6	11-19	8.0-14	4.5-6.5
	6-11	28-39	21-29	4.5-5.5
	11-20	28-39	21-29	4.5-5.5
	20-35	28-39	21-29	4.5-5.5
	35-46	28-39	21-29	4.5-6.0
	46-57	19-32	14-24	4.5-6.0
	57-67	---	---	---
GyD:				
Gilpin---------------	0-3	6.0-18	5.0-14	4.5-5.5
	3-10	6.0-11	5.0-8.0	4.5-5.5
	10-23	6.0-11	5.0-8.0	4.5-5.5
	23-33	6.0-11	5.0-8.0	4.5-5.5
	33-43	---	---	---
Upshur---------------	0-2	13-28	10-21	4.5-6.5
	2-6	11-19	8.0-14	4.5-6.5
	6-11	28-39	21-29	4.5-5.5
	11-20	28-39	21-29	4.5-5.5
	20-35	28-39	21-29	4.5-5.5
	35-46	28-39	21-29	4.5-6.0
	46-57	19-32	14-24	4.5-6.0
	57-67	---	---	---
Urban land-----------	---	---	---	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
Ha:				
Hackers	0-8	12-23	9.0-17	5.1-7.0
	8-22	9.0-18	7.0-14	5.1-7.0
	22-38	9.0-18	7.0-14	5.1-6.5
	38-44	9.0-18	7.0-14	5.1-6.5
	44-65	9.0-18	7.0-14	5.1-6.5
Ka:				
Kanawha	0-4	10-19	8.0-14	5.6-7.0
	4-9	5.0-10	4.0-8.0	5.6-7.0
	9-14	5.0-13	4.0-10	5.1-6.5
	14-24	9.0-18	7.0-14	5.1-6.5
	24-40	9.0-18	7.0-14	5.1-6.5
	40-54	9.0-18	7.0-14	5.6-6.5
	54-65	9.0-18	7.0-14	5.6-6.5
Ku:				
Kanawha	0-4	10-19	8.0-14	5.6-7.0
	4-9	5.0-10	4.0-8.0	5.6-7.0
	9-14	5.0-13	4.0-10	5.1-6.5
	14-24	9.0-18	7.0-14	5.1-6.5
	24-40	9.0-18	7.0-14	5.1-6.5
	40-54	9.0-18	7.0-14	5.6-6.5
	54-65	9.0-18	7.0-14	5.6-6.5
Urban land	---	---	---	---
Me:				
Melvin	0-4	7.0-15	5.0-11	5.6-7.8
	4-9	6.0-9.0	5.0-7.0	5.6-7.8
	9-36	6.0-18	5.0-14	5.6-7.8
	36-65	4.0-18	3.0-14	5.6-7.8
MoB:				
Monongahela	0-8	8.0-18	6.0-14	5.6-7.0
	8-12	3.0-9.0	2.0-7.0	5.6-7.0
	12-22	6.0-11	5.0-8.0	5.5-6.5
	22-33	6.0-11	5.0-8.0	5.1-6.5
	33-51	6.0-11	5.0-8.0	5.1-6.5
	51-65	3.0-11	2.0-8.0	5.0-5.8
MoC:				
Monongahela	0-8	8.0-18	6.0-14	5.6-7.0
	8-12	3.0-9.0	2.0-7.0	5.6-7.0
	12-22	6.0-11	5.0-8.0	5.5-6.5
	22-33	6.0-11	5.0-8.0	5.1-6.5
	33-51	6.0-11	5.0-8.0	5.1-6.5
	51-65	3.0-11	2.0-8.0	5.0-5.8
MuB:				
Monongahela	0-8	8.0-18	6.0-14	5.6-7.0
	8-12	3.0-9.0	2.0-7.0	5.6-7.0
	12-22	6.0-11	5.0-8.0	5.5-6.5
	22-33	6.0-11	5.0-8.0	5.1-6.5
	33-51	6.0-11	5.0-8.0	5.1-6.5
	51-65	3.0-11	2.0-8.0	5.0-5.8
Urban land	---	---	---	---

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
MuC:				
Monongahela----------	0-8	8.0-18	6.0-14	5.6-7.0
	8-12	3.0-9.0	2.0-7.0	5.6-7.0
	12-22	6.0-11	5.0-8.0	5.5-6.5
	22-33	6.0-11	5.0-8.0	5.1-6.5
	33-51	6.0-11	5.0-8.0	5.1-6.5
	51-65	3.0-11	2.0-8.0	5.0-5.8
Urban land-----------	---	---	---	---
Se:				
Sensabaugh-----------	0-6	5.0-15	4.0-11	5.6-7.0
	6-19	6.0-11	5.0-8.0	5.6-7.0
	19-25	6.0-11	5.0-8.0	5.6-7.0
	25-30	4.0-11	3.0-8.0	5.6-7.0
	30-39	4.0-12	3.0-9.0	5.6-7.0
	39-49	4.0-12	3.0-9.0	5.6-7.0
	49-65	4.0-12	3.0-9.0	5.6-7.0
SeB:				
Sensabaugh-----------	0-6	5.0-15	4.0-11	5.6-7.0
	6-19	6.0-11	5.0-8.0	5.6-7.0
	19-25	6.0-11	5.0-8.0	5.6-7.0
	25-30	4.0-11	3.0-8.0	5.6-7.0
	30-39	4.0-12	3.0-9.0	5.6-7.0
	39-49	4.0-12	3.0-9.0	5.6-7.0
	49-65	4.0-12	3.0-9.0	5.6-7.0
Su:				
Sensabaugh-----------	0-6	5.0-15	4.0-11	5.6-7.0
	6-19	6.0-11	5.0-8.0	5.6-7.0
	19-25	6.0-11	5.0-8.0	5.6-7.0
	25-30	4.0-11	3.0-8.0	5.6-7.0
	30-39	4.0-12	3.0-9.0	5.6-7.0
	39-49	4.0-12	3.0-9.0	5.6-7.0
	49-65	4.0-12	3.0-9.0	5.6-7.0
Urban land-----------	---	---	---	---
SuB:				
Sensabaugh-----------	0-6	5.0-15	4.0-11	5.6-7.0
	6-19	6.0-11	5.0-8.0	5.6-7.0
	19-25	6.0-11	5.0-8.0	5.6-7.0
	25-30	4.0-11	3.0-8.0	5.6-7.0
	30-39	4.0-12	3.0-9.0	5.6-7.0
	39-49	4.0-12	3.0-9.0	5.6-7.0
	49-65	4.0-12	3.0-9.0	5.6-7.0
Urban land-----------	---	---	---	---
Ud:				
Udorthents-----------	---	---	---	---
VaC:				
Vandalia-------------	0-6	12-24	9.0-18	4.5-6.0
	6-10	10-18	8.0-14	4.5-6.0
	10-17	18-25	14-19	5.0-6.0
	17-24	18-25	14-19	5.0-6.0
	24-33	18-25	14-19	5.0-6.0
	33-60	18-25	14-19	5.0-6.0
	60-65	14-25	11-19	5.3-7.0

Table 19.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
VaD:				
Vandalia-------------	0-6	12-24	9.0-18	4.5-6.0
	6-10	10-18	8.0-14	4.5-6.0
	10-17	18-25	14-19	5.0-6.0
	17-24	18-25	14-19	5.0-6.0
	24-33	18-25	14-19	5.0-6.0
	33-60	18-25	14-19	5.0-6.0
	60-65	14-25	11-19	5.3-7.0
VaE:				
Vandalia-------------	0-6	12-24	9.0-18	4.5-6.0
	6-10	10-18	8.0-14	4.5-6.0
	10-17	18-25	14-19	5.0-6.0
	17-24	18-25	14-19	5.0-6.0
	24-33	18-25	14-19	5.0-6.0
	33-60	18-25	14-19	5.0-6.0
	60-65	14-25	11-19	5.3-7.0
VsE:				
Vandalia-------------	0-6	12-24	9.0-18	4.5-6.0
	6-10	10-18	8.0-14	4.5-6.0
	10-17	18-25	14-19	5.0-6.0
	17-24	18-25	14-19	5.0-6.0
	24-33	18-25	14-19	5.0-6.0
	33-60	18-25	14-19	5.0-6.0
	60-65	14-25	11-19	5.3-7.0
VuD:				
Vandalia-------------	0-6	12-24	9.0-18	4.5-6.0
	6-10	10-18	8.0-14	4.5-6.0
	10-17	18-25	14-19	5.0-6.0
	17-24	18-25	14-19	5.0-6.0
	24-33	18-25	14-19	5.0-6.0
	33-60	18-25	14-19	5.0-6.0
	60-65	14-25	11-19	5.3-7.0
Urban land-----------	---	---	---	---

Table 20.--Water Features

(Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
Ch:						
Chagrin	B	January	4.0-6.0	>6.0	Brief	Occasional
		February	4.0-6.0	>6.0	Brief	Occasional
		March	4.0-6.0	>6.0	Brief	Occasional
		April	4.0-6.0	>6.0	Brief	Occasional
		May	4.0-6.0	>6.0	Brief	Occasional
		June	---	---	Brief	Occasional
		July	---	---	Brief	Occasional
		August	---	---	Brief	Occasional
		September	---	---	Brief	Occasional
		October	---	---	Brief	Occasional
		November	4.0-6.0	>6.0	Brief	Occasional
		December	4.0-6.0	>6.0	Brief	Occasional
Co:						
Cotaco	C	January	1.5-2.5	>6.0	Brief	Rare
		February	1.5-2.5	---	Brief	Rare
		March	1.5-2.5	---	Brief	Rare
		April	1.5-2.5	---	Brief	Rare
		May	1.5-2.5	---	Brief	Rare
		June	---	---	Brief	Rare
		July	---	---	Brief	Rare
		August	---	---	Brief	Rare
		September	---	---	Brief	Rare
		October	---	---	Brief	Rare
		November	1.5-2.5	---	Brief	Rare
		December	1.5-2.5	---	Brief	Rare
GaC:						
Gallia	B	Jan-Dec	---	---	---	None
GpE:						
Gilpin	C	Jan-Dec	---	---	---	None
Peabody	D	Jan-Dec	---	---	---	None
GsE:						
Gilpin	C	Jan-Dec	---	---	---	None
Peabody	D	Jan-Dec	---	---	---	None
GsF:						
Gilpin	C	Jan-Dec	---	---	---	None
Peabody	D	Jan-Dec	---	---	---	None
GuC:						
Gilpin	C	Jan-Dec	---	---	---	None
Upshur	D	Jan-Dec	---	---	---	None
GuD:						
Gilpin	C	Jan-Dec	---	---	---	None
Upshur	D	Jan-Dec	---	---	---	None
GyD:						
Gilpin	C	Jan-Dec	---	---	---	None

Table 20.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
GyD:						
Upshur-------------------	D	Jan-Dec	---	---	---	None
Urban land----------------	---	Jan-Dec	---	---	---	None
Ha:						
Hackers-------------------	B	January	---	---	Brief	Rare
		February	---	---	Brief	Rare
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
		July	---	---	Brief	Rare
		August	---	---	Brief	Rare
		September	---	---	Brief	Rare
		October	---	---	Brief	Rare
		November	---	---	Brief	Rare
		December	---	---	Brief	Rare
Ka:						
Kanawha-------------------	B	January	---	---	Brief	Rare
		February	---	---	Brief	Rare
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
		July	---	---	Brief	Rare
		August	---	---	Brief	Rare
		September	---	---	Brief	Rare
		October	---	---	Brief	Rare
		November	---	---	Brief	Rare
		December	---	---	Brief	Rare
Ku:						
Kanawha-------------------	B	January	---	---	Brief	Rare
		February	---	---	Brief	Rare
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
		July	---	---	Brief	Rare
		August	---	---	Brief	Rare
		September	---	---	Brief	Rare
		October	---	---	Brief	Rare
		November	---	---	Brief	Rare
		December	---	---	Brief	Rare
Urban land----------------	---	Jan-Dec	---	---	---	None
Me:						
Melvin--------------------	D	January	0.0-0.5	>6.0	Brief	Rare
		February	0.0-0.5	>6.0	Brief	Rare
		March	0.0-0.5	>6.0	Brief	Rare
		April	0.0-0.5	>6.0	Brief	Rare
		May	0.0-0.5	>6.0	Brief	Rare
		June	0.3-0.8	>6.0	Brief	Rare
		July	0.3-0.8	>6.0	Brief	Rare
		August	0.3-0.8	>6.0	Brief	Rare
		September	0.3-0.8	>6.0	Brief	Rare
		October	0.3-0.8	>6.0	Brief	Rare
		November	0.0-0.5	>6.0	Brief	Rare
		December	0.0-0.5	>6.0	Brief	Rare

Table 20.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
MoB:						
Monongahela	C	January	1.5-3.0	3.7-5.4	---	None
		February	1.5-3.0	3.7-5.4	---	None
		March	1.5-3.0	3.7-5.4	---	None
		April	1.5-3.0	3.7-5.4	---	None
		November	1.5-3.0	3.7-5.4	---	None
		December	1.5-3.0	3.7-5.4	---	None
MoC:						
Monongahela	C	January	1.5-3.0	3.7-5.4	---	None
		February	1.5-3.0	3.7-5.4	---	None
		March	1.5-3.0	3.7-5.4	---	None
		April	1.5-3.0	3.7-5.4	---	None
		November	1.5-3.0	3.7-5.4	---	None
		December	1.5-3.0	3.7-5.4	---	None
MuB:						
Monongahela	C	January	1.5-3.0	3.7-5.4	---	None
		February	1.5-3.0	3.7-5.4	---	None
		March	1.5-3.0	3.7-5.4	---	None
		April	1.5-3.0	3.7-5.4	---	None
		November	1.5-3.0	3.7-5.4	---	None
		December	1.5-3.0	3.7-5.4	---	None
Urban land	---	Jan-Dec	---	---	---	None
MuC:						
Monongahela	C	January	1.5-3.0	3.7-5.4	---	None
		February	1.5-3.0	3.7-5.4	---	None
		March	1.5-3.0	3.7-5.4	---	None
		April	1.5-3.0	3.7-5.4	---	None
		November	1.5-3.0	3.7-5.4	---	None
		December	1.5-3.0	3.7-5.4	---	None
Urban land	---	Jan-Dec	---	---	---	None
Se:						
Sensabaugh	B	January	4.0-6.0	>6.0	Brief	Occasional
		February	4.0-6.0	>6.0	Brief	Occasional
		March	4.0-6.0	>6.0	Brief	Occasional
		April	4.0-6.0	>6.0	Brief	Occasional
		May	---	---	Brief	Occasional
		June	---	---	Brief	Occasional
		July	---	---	Brief	Occasional
		August	---	---	Brief	Occasional
		September	---	---	Brief	Occasional
		October	---	---	Brief	Occasional
		November	---	---	Brief	Occasional
		December	4.0-6.0	>6.0	Brief	Occasional
SeB:						
Sensabaugh	B	January	4.0-6.0	>6.0	Brief	Rare
		February	4.0-6.0	>6.0	Brief	Rare
		March	4.0-6.0	>6.0	Brief	Rare
		April	4.0-6.0	>6.0	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
		July	---	---	Brief	Rare
		August	---	---	Brief	Rare
		September	---	---	Brief	Rare
		October	---	---	Brief	Rare
		November	---	---	Brief	Rare
		December	4.0-6.0	>6.0	Brief	Rare

Table 20.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Months	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
Su:						
Sensabaugh	B	January	4.0-6.0	>6.0	Brief	Occasional
		February	4.0-6.0	>6.0	Brief	Occasional
		March	4.0-6.0	>6.0	Brief	Occasional
		April	4.0-6.0	>6.0	Brief	Occasional
		May	---	---	Brief	Occasional
		June	---	---	Brief	Occasional
		July	---	---	Brief	Occasional
		August	---	---	Brief	Occasional
		September	---	---	Brief	Occasional
		October	---	---	Brief	Occasional
		November	---	---	Brief	Occasional
		December	4.0-6.0	>6.0	Brief	Occasional
Urban land	---	Jan-Dec	---	---	---	None
SuB:						
Sensabaugh	B	January	4.0-6.0	>6.0	Brief	Rare
		February	4.0-6.0	>6.0	Brief	Rare
		March	4.0-6.0	>6.0	Brief	Rare
		April	4.0-6.0	>6.0	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
		July	---	---	Brief	Rare
		August	---	---	Brief	Rare
		September	---	---	Brief	Rare
		October	---	---	Brief	Rare
		November	---	---	Brief	Rare
		December	4.0-6.0	>6.0	Brief	Rare
Urban land	---	Jan-Dec	---	---	---	None
Ud:						
Udorthents	---	Jan-Dec	---	---	---	None
VaC:						
Vandalia	D	February	4.0-6.0	>6.0	---	None
		March	4.0-6.0	>6.0	---	None
VaD:						
Vandalia	D	February	4.0-6.0	>6.0	---	None
		March	4.0-6.0	>6.0	---	None
VaE:						
Vandalia	D	February	4.0-6.0	>6.0	---	None
		March	4.0-6.0	>6.0	---	None
VsE:						
Vandalia	D	February	4.0-6.0	>6.0	---	None
		March	4.0-6.0	>6.0	---	None
VuD:						
Vandalia	D	February	4.0-6.0	>6.0	---	None
		March	4.0-6.0	>6.0	---	None
Urban land	---	Jan-Dec	---	---	---	None

Table 21.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
Ch:							
Chagrin	---	---	---	---	Moderate	Low	Moderate
Co:							
Cotaco	---	---	---	---	Moderate	Moderate	High
GaC:							
Gallia	---	---	---	---	Moderate	Low	High
GpE:							
Gilpin	Bedrock (lithic)	20-40	---	Indurated	Moderate	Low	High
Peabody	Bedrock (paralithic)	20-40	4-10	Noncemented	Moderate	High	Moderate
	Bedrock (lithic)	20-40	---	Indurated			
GsE:							
Gilpin	Bedrock (lithic)	20-40	---	Indurated	Moderate	Low	High
Peabody	Bedrock (paralithic)	20-40	4-10	Noncemented	Moderate	High	Moderate
	Bedrock (lithic)	20-40	---	Indurated			
GsF:							
Gilpin	Bedrock (lithic)	20-40	---	Indurated	Moderate	Low	High
Peabody	Bedrock (paralithic)	20-40	4-10	Noncemented	Moderate	High	Moderate
	Bedrock (lithic)	20-40	---	Indurated			
GuC:							
Gilpin	Bedrock (lithic)	20-40	---	Indurated	Moderate	Low	High
Upshur	Bedrock (paralithic)	40-60	---	Moderately cemented	Moderate	High	Moderate
GuD:							
Gilpin	Bedrock (lithic)	20-40	---	Indurated	Moderate	Low	High
Upshur	Bedrock (paralithic)	40-60	---	Moderately cemented	Moderate	High	Moderate

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
GyD:							
Gilpin	Bedrock (lithic)	20-40	---	Indurated	Moderate	Low	High
Upshur	Bedrock (paralithic)	40-60	---	Moderately cemented	Moderate	High	Moderate
Urban land	---	---	---	---	---	---	---
Ha:							
Hackers	---	---	---	---	High	Low	Moderate
Ka:							
Kanawha	---	---	---	---	Moderate	Low	Moderate
Ku:							
Kanawha	---	---	---	---	Moderate	Low	Moderate
Urban land	---	---	---	---	---	---	---
Me:							
Melvin	---	---	---	---	High	High	Low
MoB:							
Monongahela	Fragipan	20-30	25-35	Noncemented	Moderate	High	High
MoC:							
Monongahela	Fragipan	20-30	25-35	Noncemented	Moderate	High	High
MuB:							
Monongahela	Fragipan	20-30	25-35	Noncemented	Moderate	High	High
Urban land	---	---	---	---	---	---	---
MuC:							
Monongahela	Fragipan	20-30	25-35	Noncemented	Moderate	High	High
Urban land	---	---	---	---	---	---	---
Se:							
Sensabaugh	---	---	---	---	Moderate	Low	Low
SeB:							
Sensabaugh	---	---	---	---	Moderate	Low	Low

Table 21.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated steel	Concrete
		In	In				
Su:							
Sensabaugh-------------	---	---	---	---	Moderate	Low	Low
Urban land-------------	---	---	---	---	---	---	---
SuB:							
Sensabaugh-------------	---	---	---	---	Moderate	Low	Low
Urban land-------------	---	---	---	---	---	---	---
Ud:							
Udorthents-------------	---	---	---	---	---	---	---
VaC:							
Vandalia---------------	---	---	---	---	Moderate	High	Moderate
VaD:							
Vandalia---------------	---	---	---	---	Moderate	High	Moderate
VaE:							
Vandalia---------------	---	---	---	---	Moderate	High	Moderate
VsE:							
Vandalia---------------	---	---	---	---	Moderate	High	Moderate
VuD:							
Vandalia---------------	---	---	---	---	Moderate	High	Moderate
Urban land-------------	---	---	---	---	---	---	---

Table 22.--Classification of the Soils

Soil name	Family or higher taxonomic class
Chagrin	Fine-loamy, mixed, active, mesic Dystric Fluventic Eutrudepts
Cotaco	Fine-loamy, mixed, semiactive, mesic Aquic Hapludults
Gallia	Fine-loamy, siliceous, active, mesic Typic Paleudalfs
Gilpin	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Hackers	Fine-silty, mixed, active, mesic Typic Hapludalfs
Kanawha	Fine-loamy, mixed, active, mesic Typic Hapludalfs
Melvin	Fine-silty, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts
Monongahela	Fine-loamy, mixed, semiactive, mesic Typic Fragiudults
Peabody	Fine, mixed, active, mesic Ultic Hapludalfs
Sensabaugh	Fine-loamy, mixed, semiactive, mesic Dystric Fluventic Eutrudepts
Udorthents	Udorthents
Upshur	Fine, mixed, superactive, mesic Typic Hapludalfs
Vandalia	Fine, mixed, active, mesic Typic Hapludalfs

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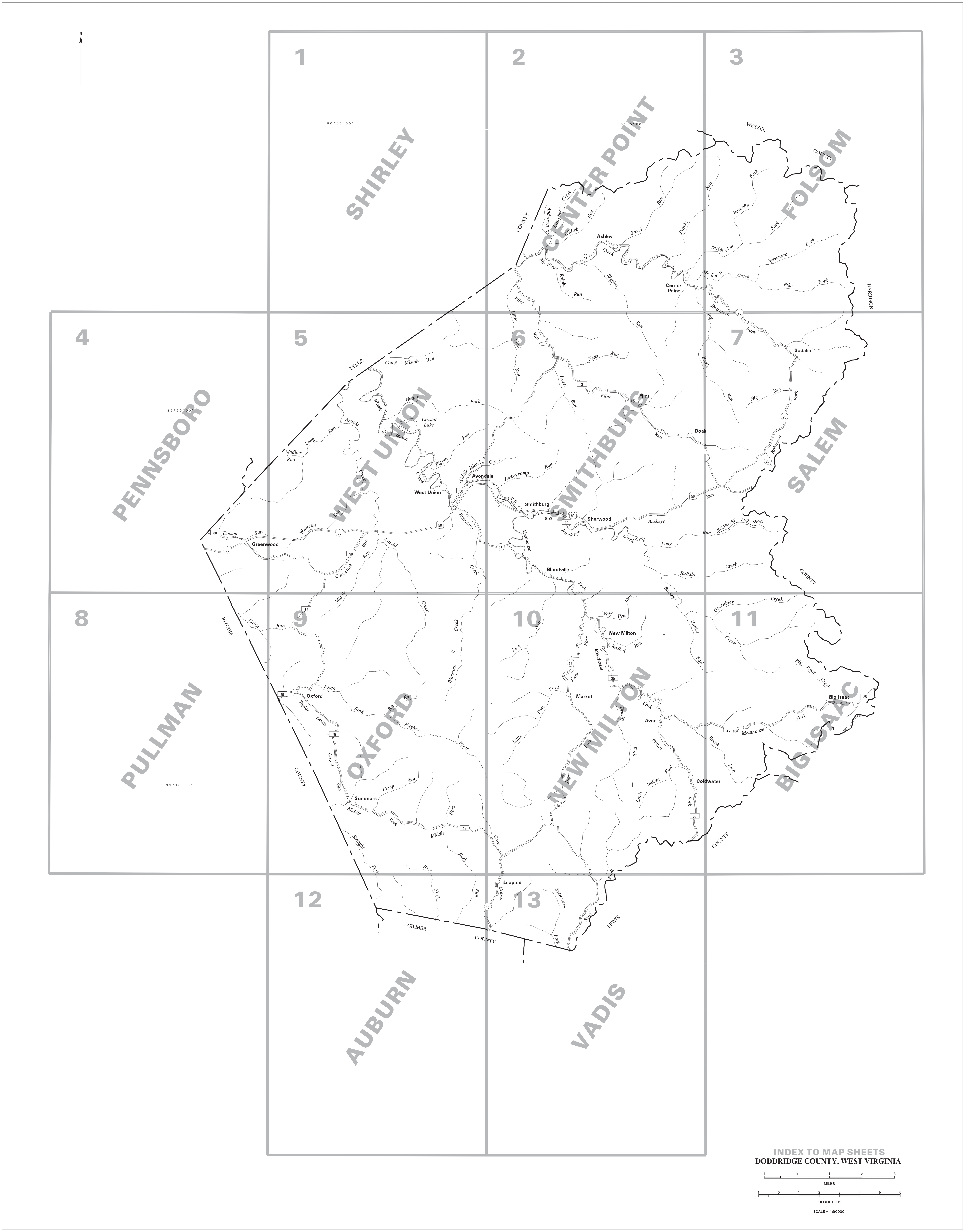
1 SHIRLEY
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3 FOLSOM
4 PENNSBORO
5 WEST UNION
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7 SALEM
8 PULLMAN
9 OXFORD
10 NEW MILTON
11 BIG ISAAC
12 AUBURN
13 VADIS
WETZEL COUNTY
HARRISON COUNTY
TYLER COUNTY
RITCHIE COUNTY
GILMER COUNTY
LEWIS
Ashley
Center Point
Sedalia
Flint
Doak
Avondale
West Union
Smithburg
Sherwood
Greenwood
Blandville
New Milton
Market
Avon
Big Isaac
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Oxford
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Leopold
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BALTIMORE AND OHIO
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DODDRIDGE COUNTY, WEST VIRGINIA
MILES
KILOMETERS
SCALE = 1:90000

SOIL LEGEND

SYMBOL	NAME
Ch	Chagrin silt loam
Co	Cotaco silt loam
GaC	Gallia silt loam, 8 to 15 percent slopes
GpE	Gilpin-Peabody complex, 25 to 35 percent slopes
GsE	Gilpin-Peabody complex, 15 to 35 percent slopes, very stony
GsF	Gilpin-Peabody complex, 35 to 70 percent slopes, very stony
GuC	Gilpin-Upshur complex, 8 to 15 percent slopes
GuD	Gilpin-Upshur complex, 15 to 25 percent slopes
GyD	Gilpin-Upshur-Urban land complex, 15 to 25 percent slopes
Ha	Hackers silt loam
Ka	Kanawha loam
Ku	Kanawha-Urban land complex
Me	Melvin silt loam
MoB	Monongahela silt loam, 3 to 8 percent slopes
MoC	Monongahela silt loam, 8 to 15 percent slopes
MuB	Monongahela-Urban land complex, 3 to 8 percent slopes
MuC	Monongahela-Urban land complex, 8 to 15 percent slopes
Se	Sensabaugh silt loam
SeB	Sensabaugh silt loam, 3 to 8 percent slopes, rarely flooded
Su	Sensabaugh-Urban land complex
SuB	Sensabaugh-Urban land complex, 3 to 8 percent slopes, rarely flooded
Ud	Udorthents, smoothed
VaC	Vandalia silt loam, 8 to 15 percent slopes
VaD	Vandalia silt loam, 15 to 25 percent slopes
VaE	Vandalia silt loam, 25 to 35 percent slopes
VsE	Vandalia silt loam, 15 to 35 percent slopes, very stony
VuD	Vandalia-Urban land complex, 15 to 25 percent slopes
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park)
- Land grant
- Limit of soil survey (label) and/or denied access area
- Field sheet matchline & neatline
- Previously Published Survey

OTHER BOUNDARY (label)

- Airport, airfield
- Cemetery
- City/county park

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(section and land grants)

GEOGRAPHIC COORDINATE TICK

TRANSPORTATION

- Divided roads
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 173 — 79 345
- Federal — 287 — 410 224
- State — 52 — 52 347
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE
(normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad
- Single side slope (showing actual feature location)

DAMS

- Medium or Small

LANDFORM FEATURES

- Prominent hill or peak
- Soil Sample Site

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Other Religion (label) — Mt Carmel
- Located object (label) — Ranger Station
- Tank (label) — Petroleum
- Lookout Tower
- Oil and/or Natural Gas Wells
- Windmill
- Lighthouse

HYDROGRAPHIC FEATURES

STREAMS

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

DRAINAGE AND IRRIGATION

- Double-line canal (label) — CANAL
- Perennial drainage and/or irrigation ditch
- Intermittent drainage and/ or irrigation ditch

SMALL LAKES, PONDS AND RESERVOIRS

- Perennial water
- Miscellaneous water
- Flood pool line — FLOOD POOL LINE

MISCELLANEOUS WATER FEATURES

- Spring
- Well, artesian
- Well, irrigation

SPECIAL SYMBOLS FOR SOIL SURVEY AND SSURGO

SOIL DELINEATIONS AND SYMBOLS — GaC MoC

LANDFORM FEATURES

ESCARPMENTS

- Bedrock
- Other than bedrock

SHORT STEEP SLOPE

GULLY

DEPRESSION, closed

SINKHOLE

EXCAVATIONS

PITS

- Borrow pits
- Gravel pit
- Mine or quarry

LANDFILL

MISCELLANEOUS SURFACE FEATURES

- Blowout
- Clay spot
- Gravelly spot
- Lava flow
- Marsh or swamp
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip
- Sodic spot
- Spoil area
- Stony spot
- Very stony spot
- Wet spot

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DODDRIDGE COUNTY, WEST VIRGINIA
SHIRLEY QUADRANGLE
SHEET NUMBER 1 OF 13

SCALE 1:24000

MILES

FEET

KILOMETERS

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and the West Virginia Agriculture Experiment Station. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1997 aerial photography. Hydrography was acquired from the U.S. Geological Survey topographic quadrangles and from field observation. Hydrography was edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

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SHIRLEY, WEST VIRGINIA

7.5 MINUTE SERIES

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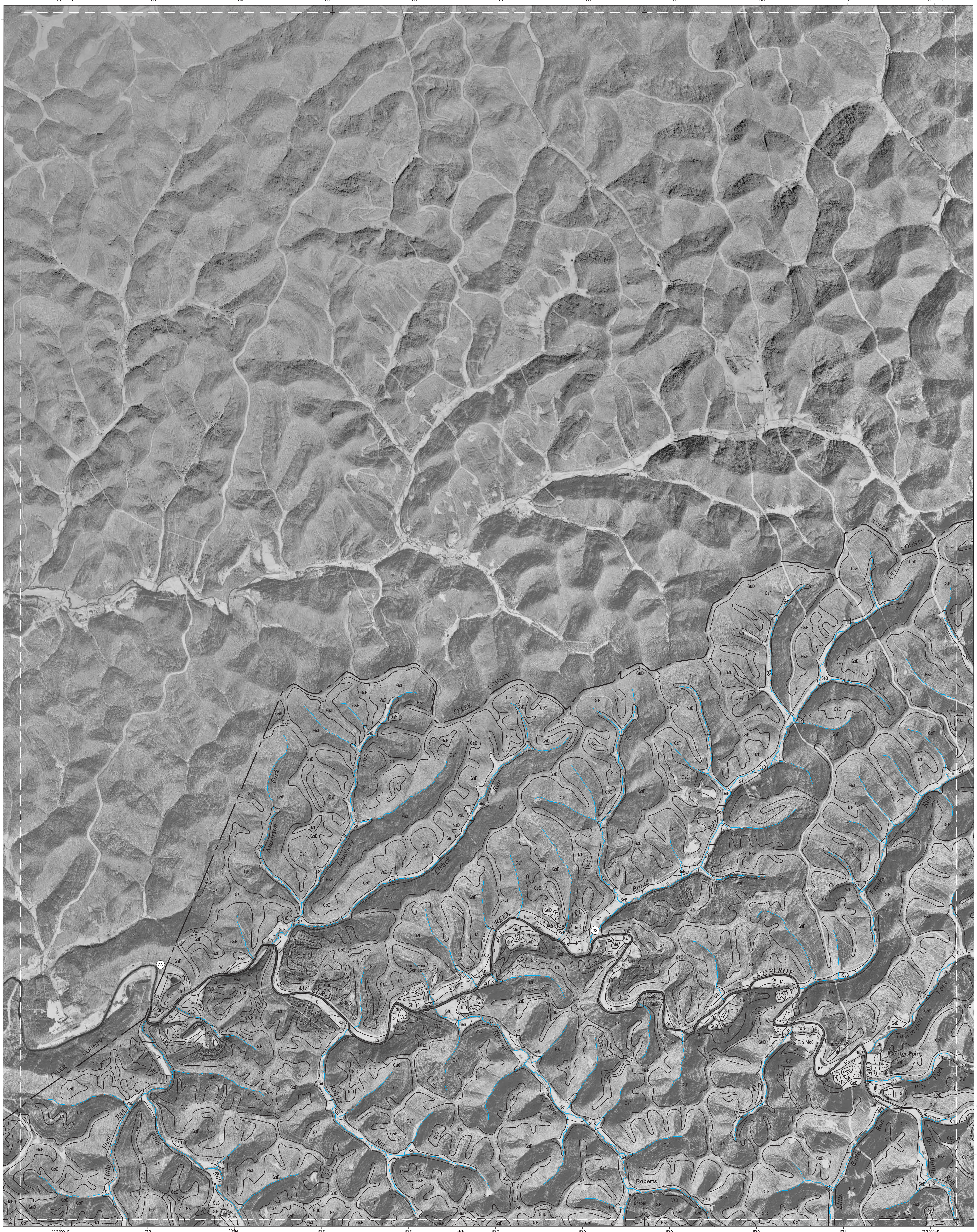
Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DODDRIDGE COUNTY, WEST VIRGINIA
CENTER POINT QUADRANGLE
SHEET NUMBER 2 OF 13



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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

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CENTER POINT, WEST VIRGINIA
7.5 MINUTE SERIES
SHEET NUMBER 2 OF 13

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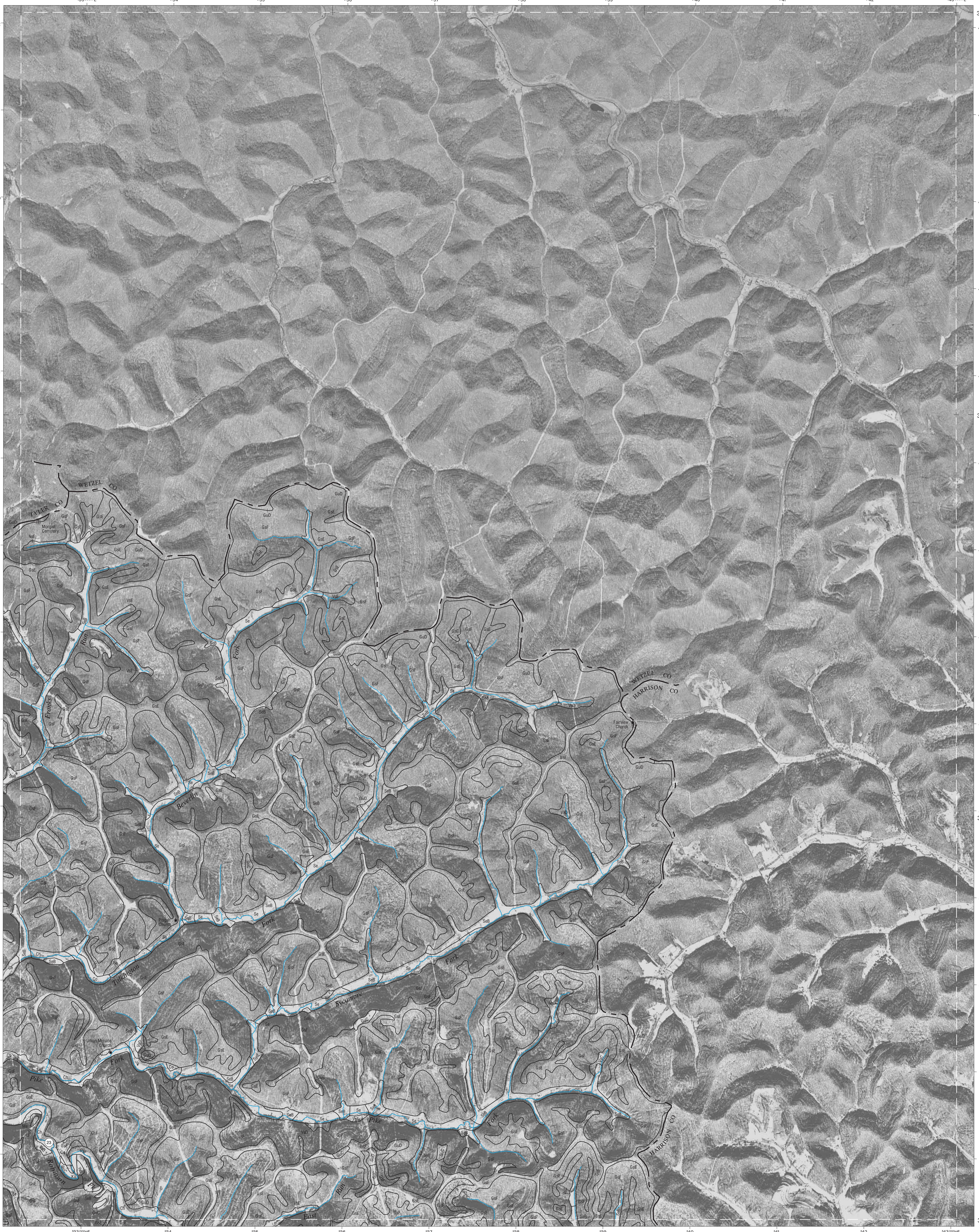

Joins sheet 2, Center Point

Joins sheet 7, Salem

Joins sheet 6, Smithburg

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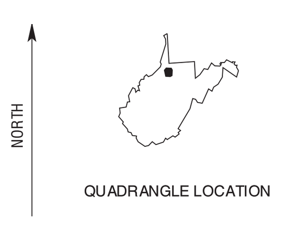

QUADRANGLE LOCATION

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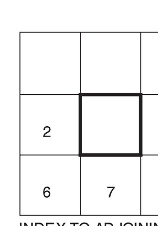
KILOMETERS: 1 — 0 — 1



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FOLSOM, WEST VIRGINIA
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DEPARTMENT OF AGRICULTURE
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DODDRIDGE COUNTY, WEST VIRGINIA
PENNSBORO QUADRANGLE
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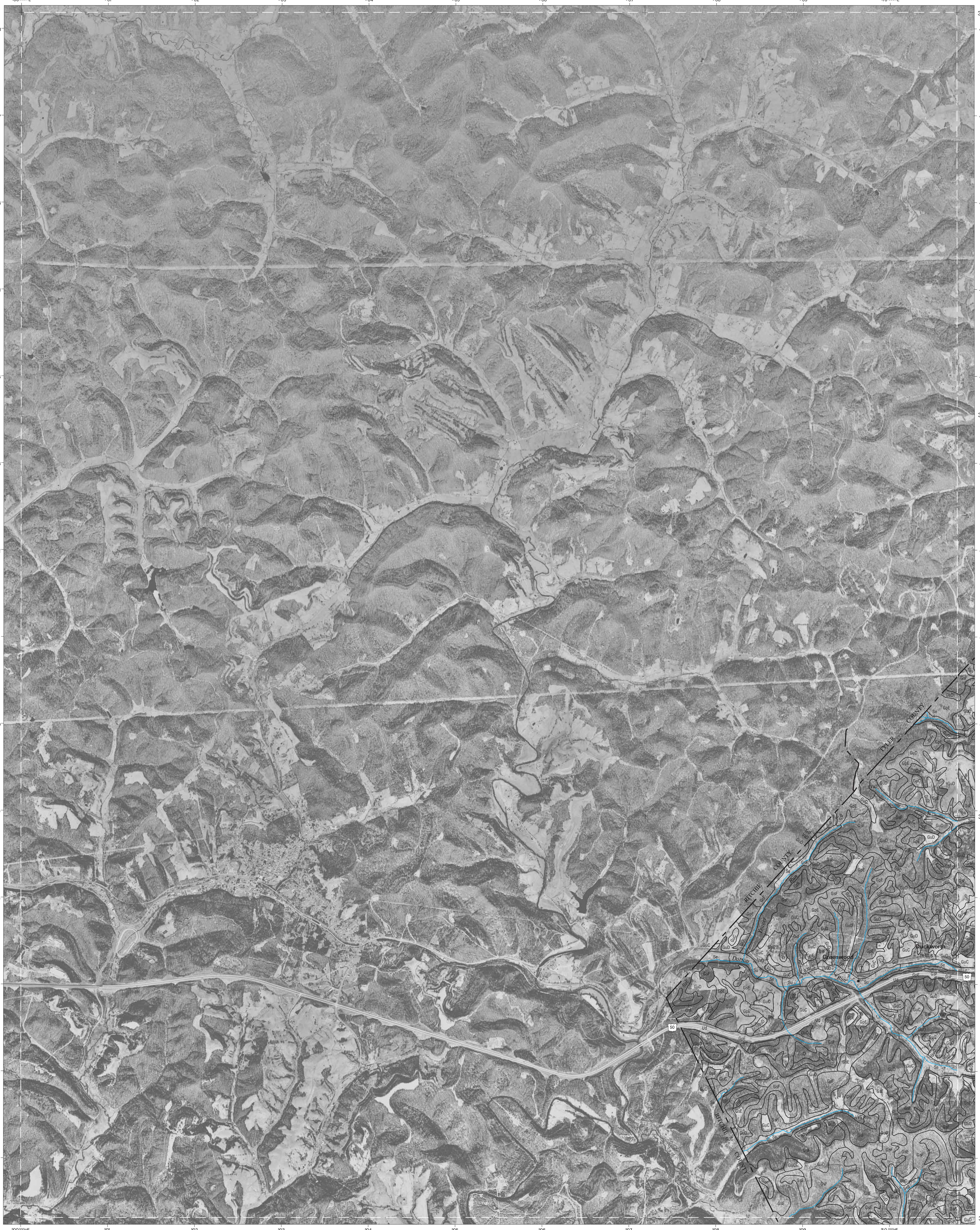

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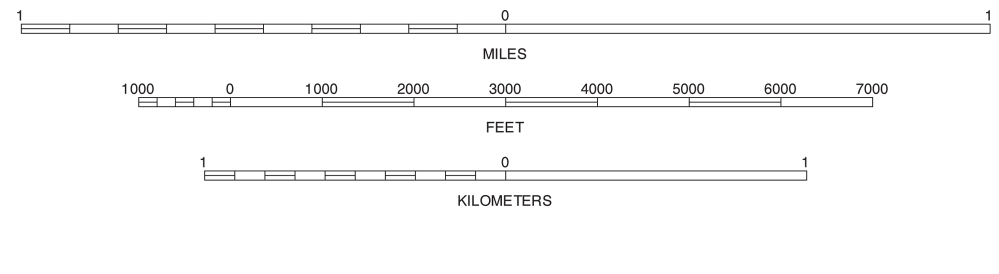

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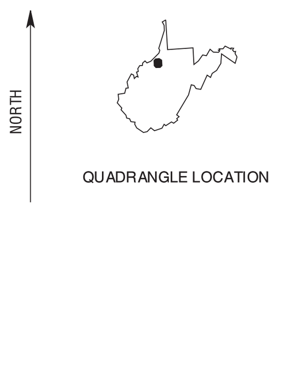

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9 OXFORD

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DODDRIDGE COUNTY, WEST VIRGINIA
WEST UNION QUADRANGLE
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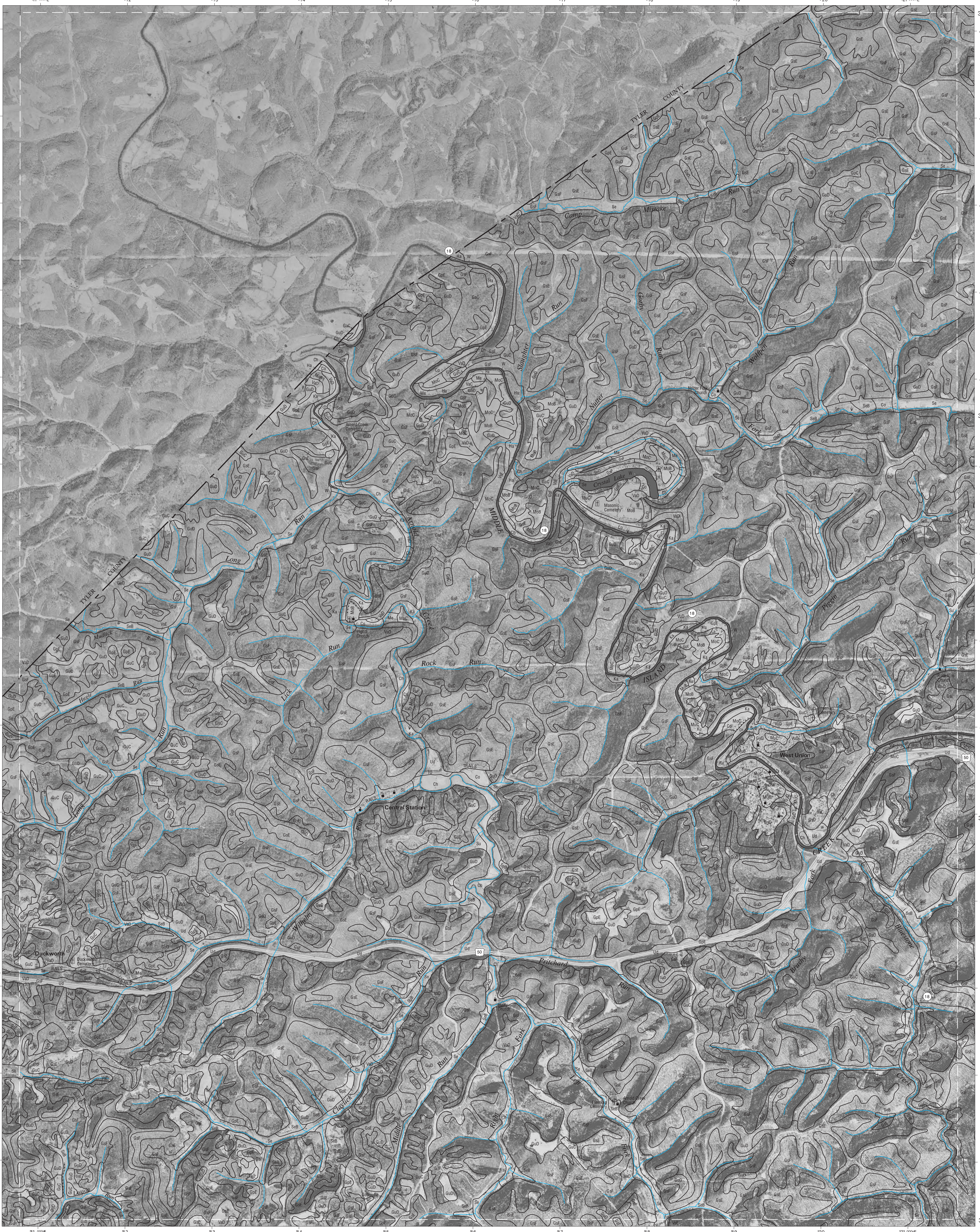
Joins sheet 1, Shirley

Joins sheet 2, Center Point



Joins sheet 4, Pennsboro

Joins sheet 6, Smithburg

Joins sheet 8, Pullman

Joins sheet 9, Oxford

Joins sheet 10, New Milton

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NORTH

QUADRANGLE LOCATION

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MILES

FEET

KILOMETERS

	1	2
4		6
8	9	10

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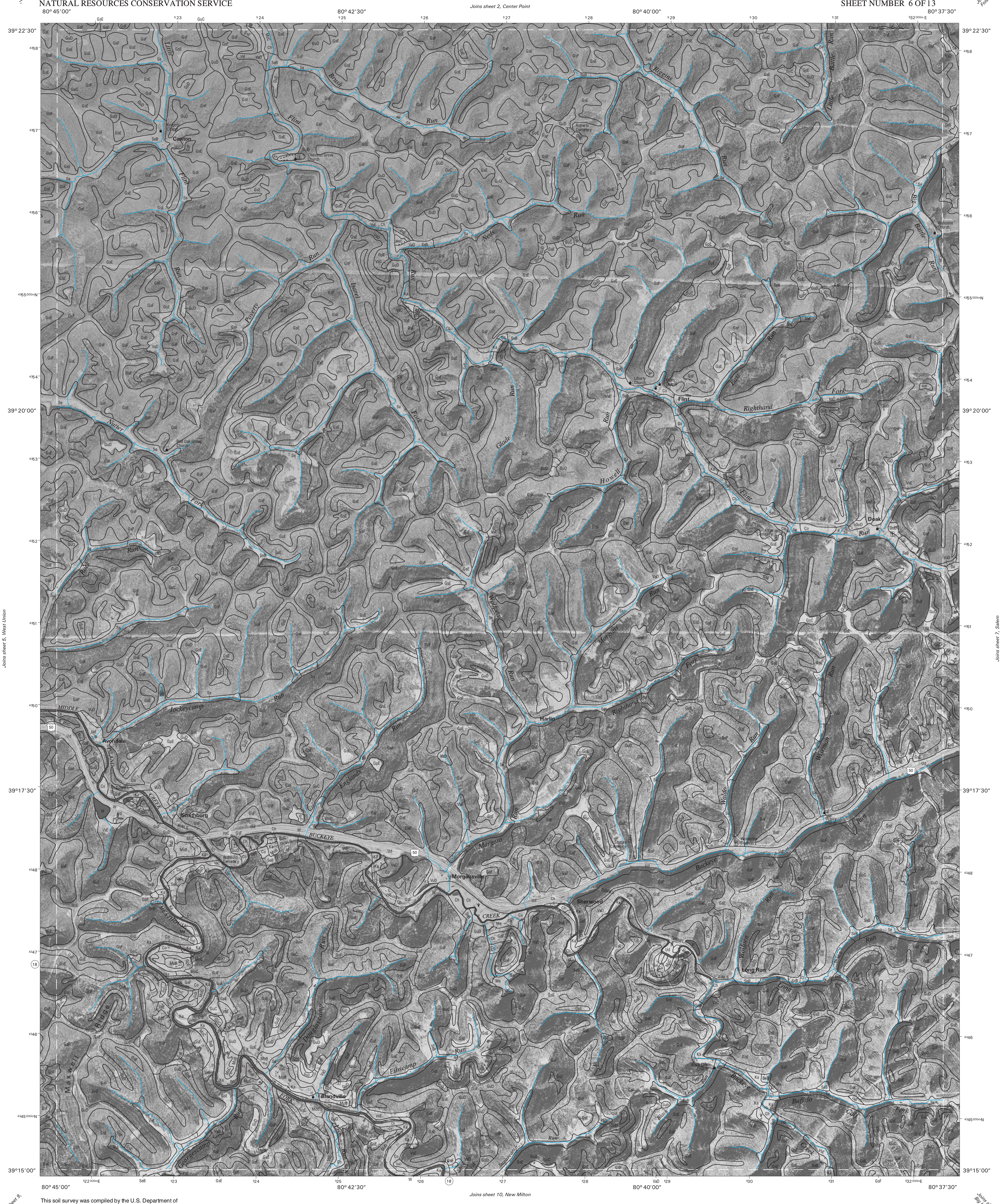
DODDRIDGE COUNTY, WEST VIRGINIA
SMITHBURG QUADRANGLE
SHEET NUMBER 6 OF 13



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QUADRANGLE LOCATION

SCALE 1:24000

MILES 1 0 1

FEET 1000 0 1000 2000 3000 4000 5000 6000 7000

KILOMETERS 1 0 1

1	2	3
5		7
9	10	11

1 SHIRLEY
2 CENTER POINT
3 FOLSOM
5 WEST UNION
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9 OXFORD
10 NEW MILTON
11 BIG ISAAC

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DODDRIDGE COUNTY, WEST VIRGINIA
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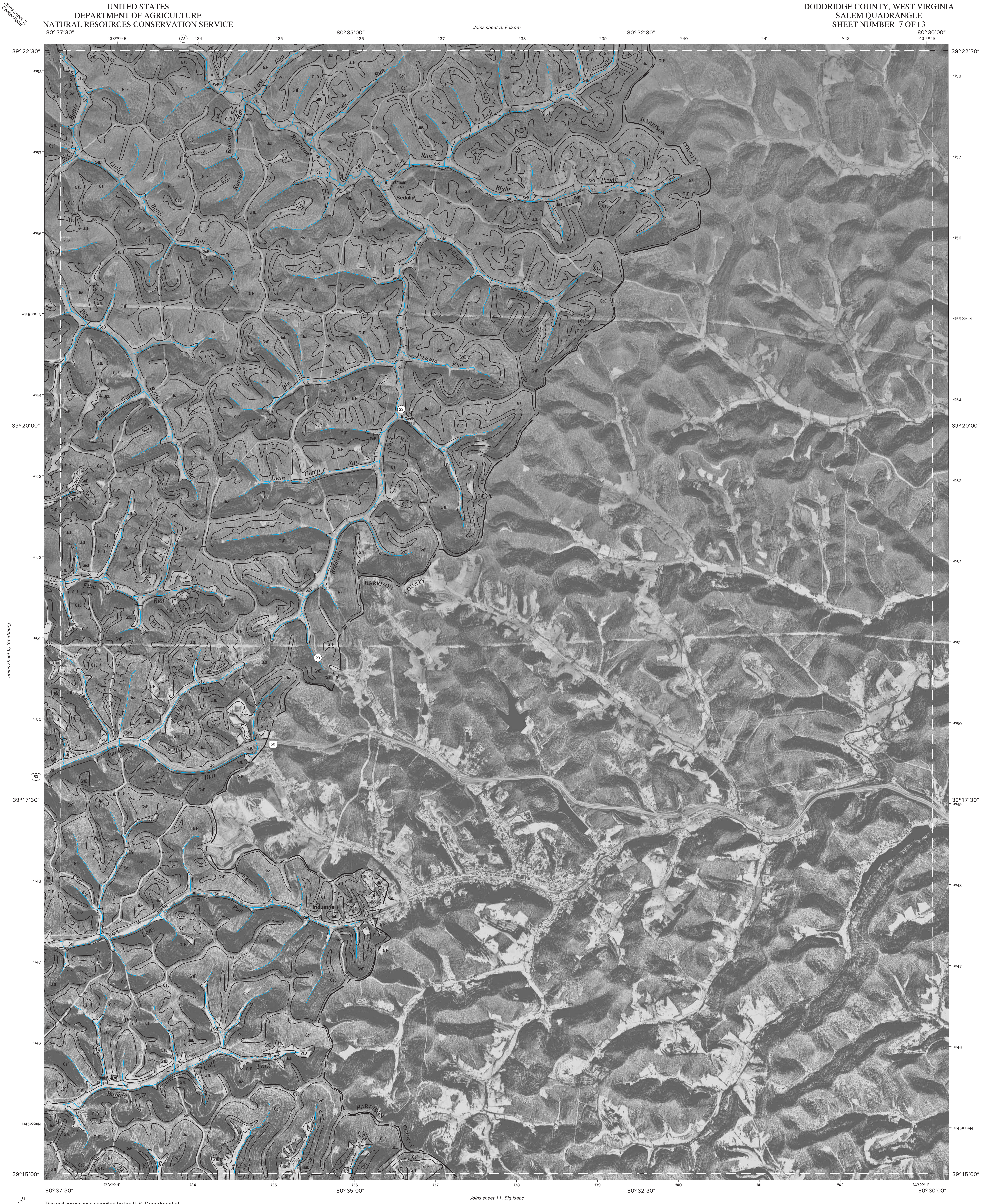

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NORTH

QUADRANGLE LOCATION

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MILES

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KILOMETERS

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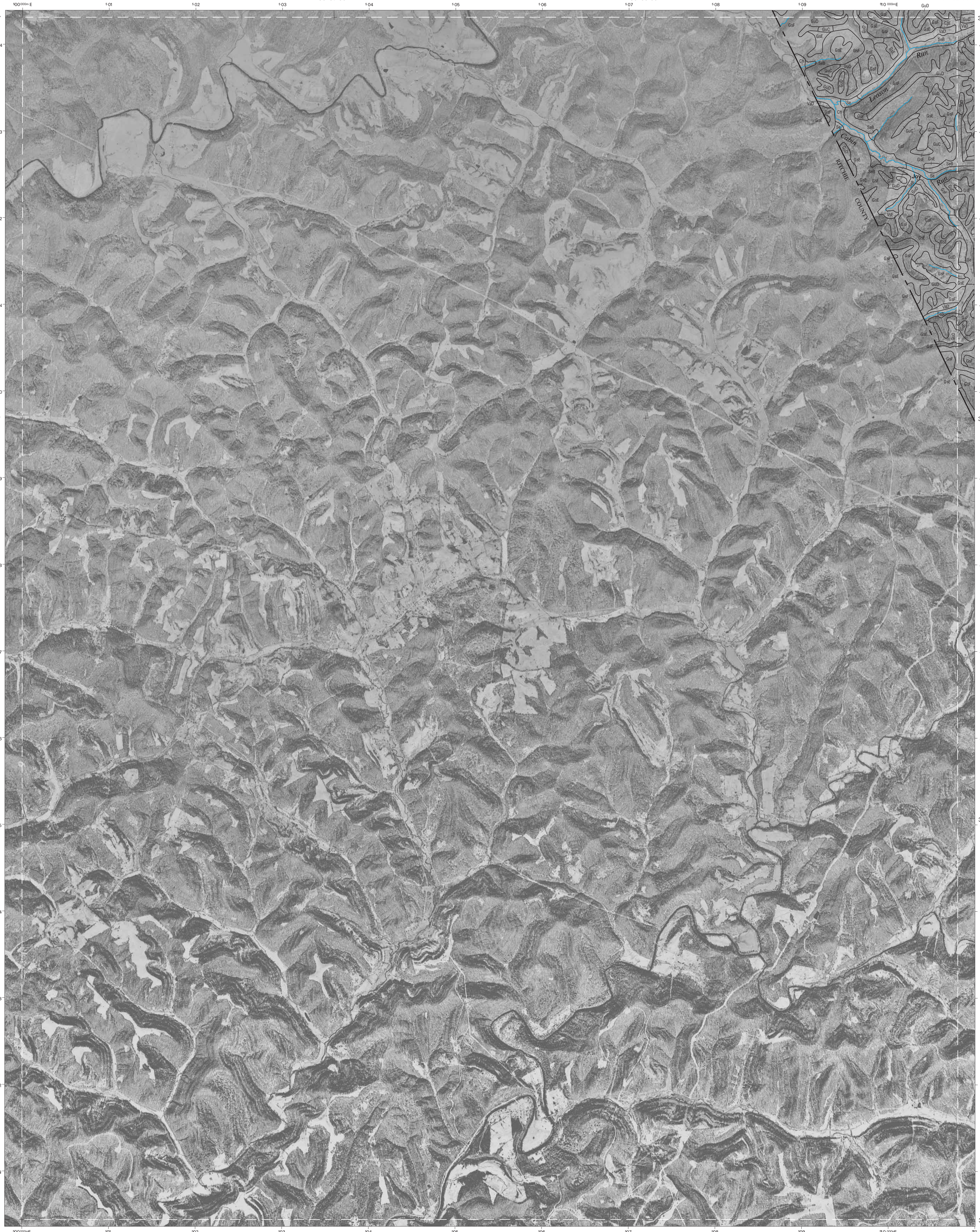
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DODDRIDGE COUNTY, WEST VIRGINIA
PULLMAN QUADRANGLE
SHEET NUMBER 8 OF 13

Joins sheet 4, Pennsboro

Joins sheet 5, West Union



Joins sheet 9, Oxford

Joins sheet 12, Auburn

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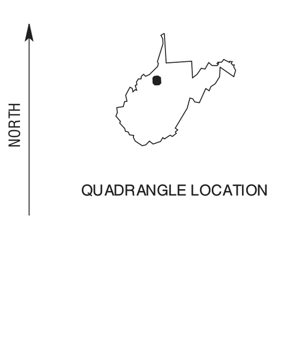
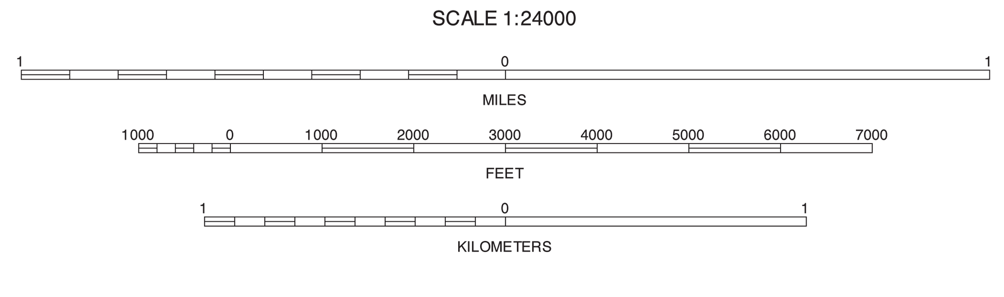
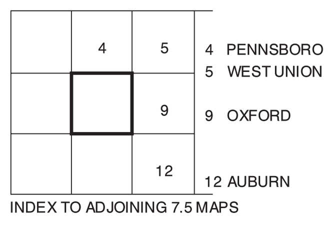


QUADRANGLE LOCATION

SCALE 1:24000





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PULLMAN, WEST VIRGINIA

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DODDRIDGE COUNTY, WEST VIRGINIA
OXFORD QUADRANGLE
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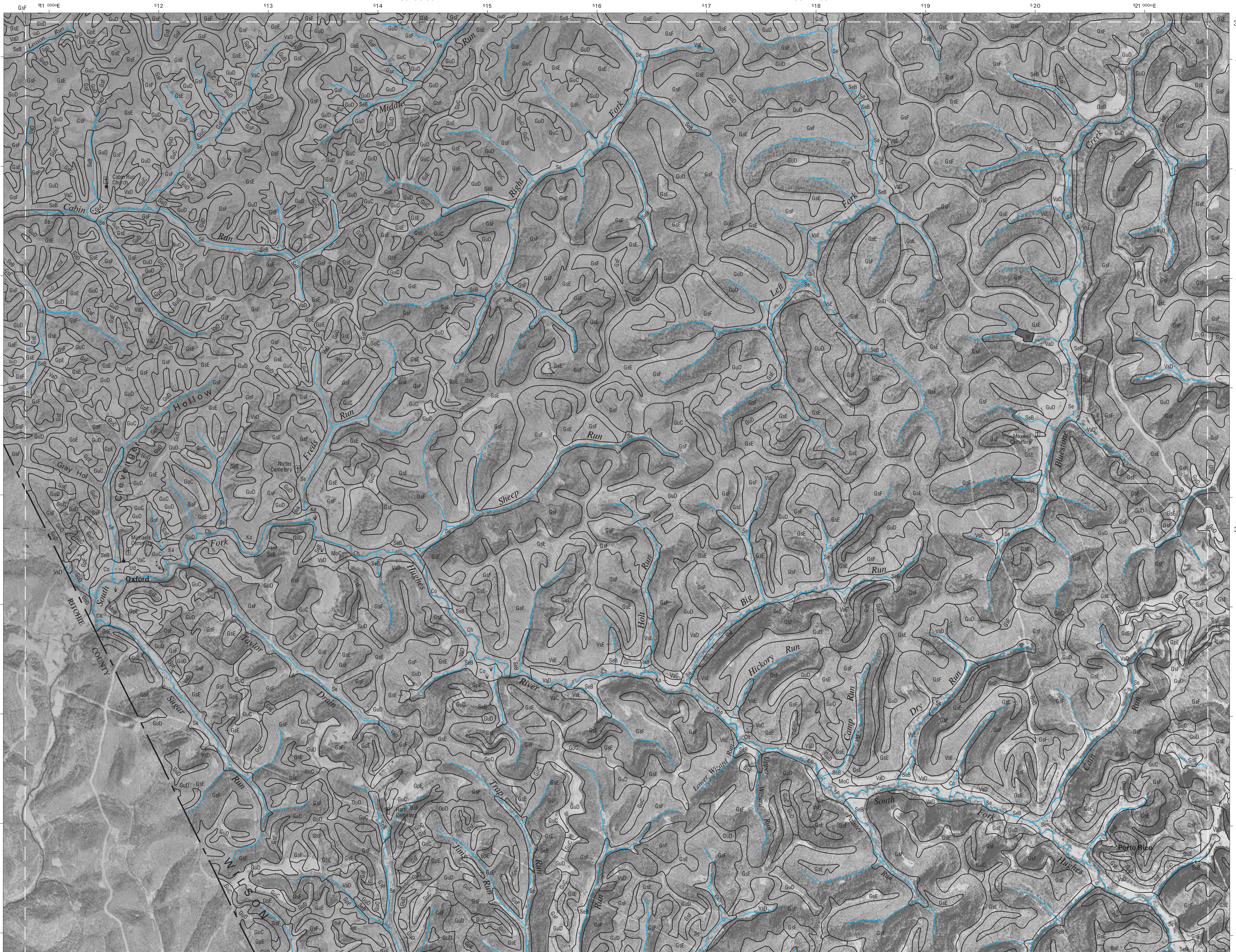
Joins sheet 4, Pennsboro

Joins sheet 5, West Union

Joins sheet 6, Smithburg



Joins sheet 8, Pullman

Joins sheet 10, New Milton

Joins sheet 12, Auburn

Joins sheet 13, Vadis

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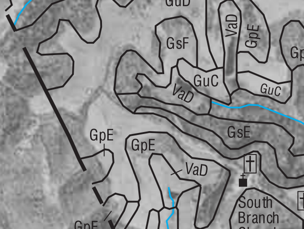
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

4	5	6
8		10
	12	13

4 PENNSBORO
5 WEST UNION
6 SMITHBURG
8 PULLMAN
10 NEW MILTON
12 AUBURN
13 VADIS

INDEX TO ADJOINING 7.5 MAPS

OXFORD, WEST VIRGINIA
7.5 MINUTE SERIES
SHEET NUMBER 9 OF 13

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

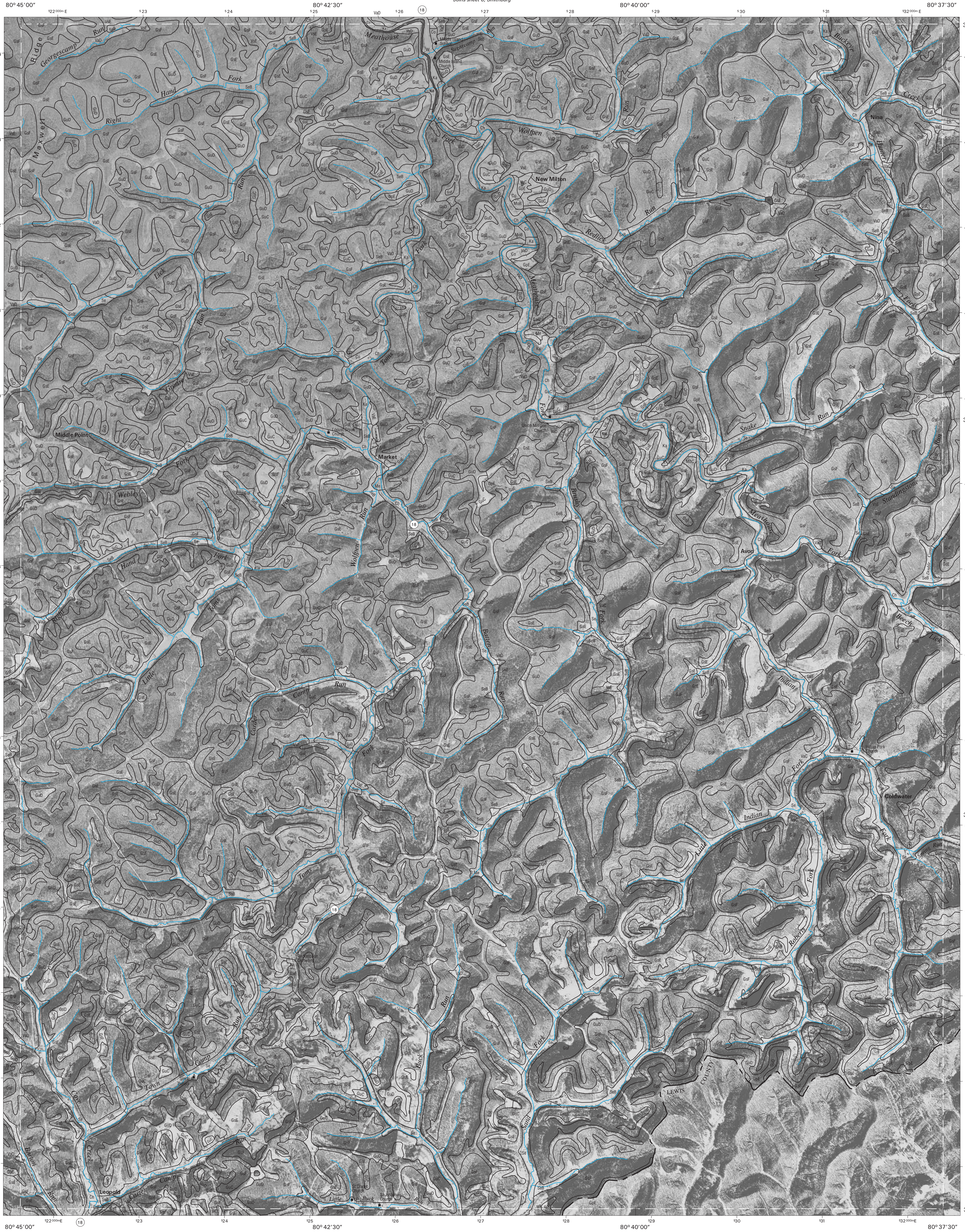
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DODDRIDGE COUNTY, WEST VIRGINIA
NEW MILTON QUADRANGLE
SHEET NUMBER 10 OF 13

Joins sheet 5, West Union

Joins sheet 6, Smithburg

Joins sheet 7, Salem



Joins sheet 9, Oxford

Joins sheet 11, Big Isaac

Joins sheet 12, Auburn

Joins sheet 13, Vadis

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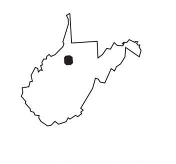
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

5	6	7
9		11
12	13	

5 WEST UNION
6 SMITHBURG
7 SALEM
9 OXFORD
11 BIG ISAAC
12 AUBURN
13 VADIS

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NEW MILTON, WEST VIRGINIA
7.5 MINUTE SERIES
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UNITED STATES
DEPARTMENT OF AGRICULTURE
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DODDRIDGE COUNTY, WEST VIRGINIA
BIG ISAAC QUADRANGLE
SHEET NUMBER 11 OF 13

Joins sheet 6, Smithburg

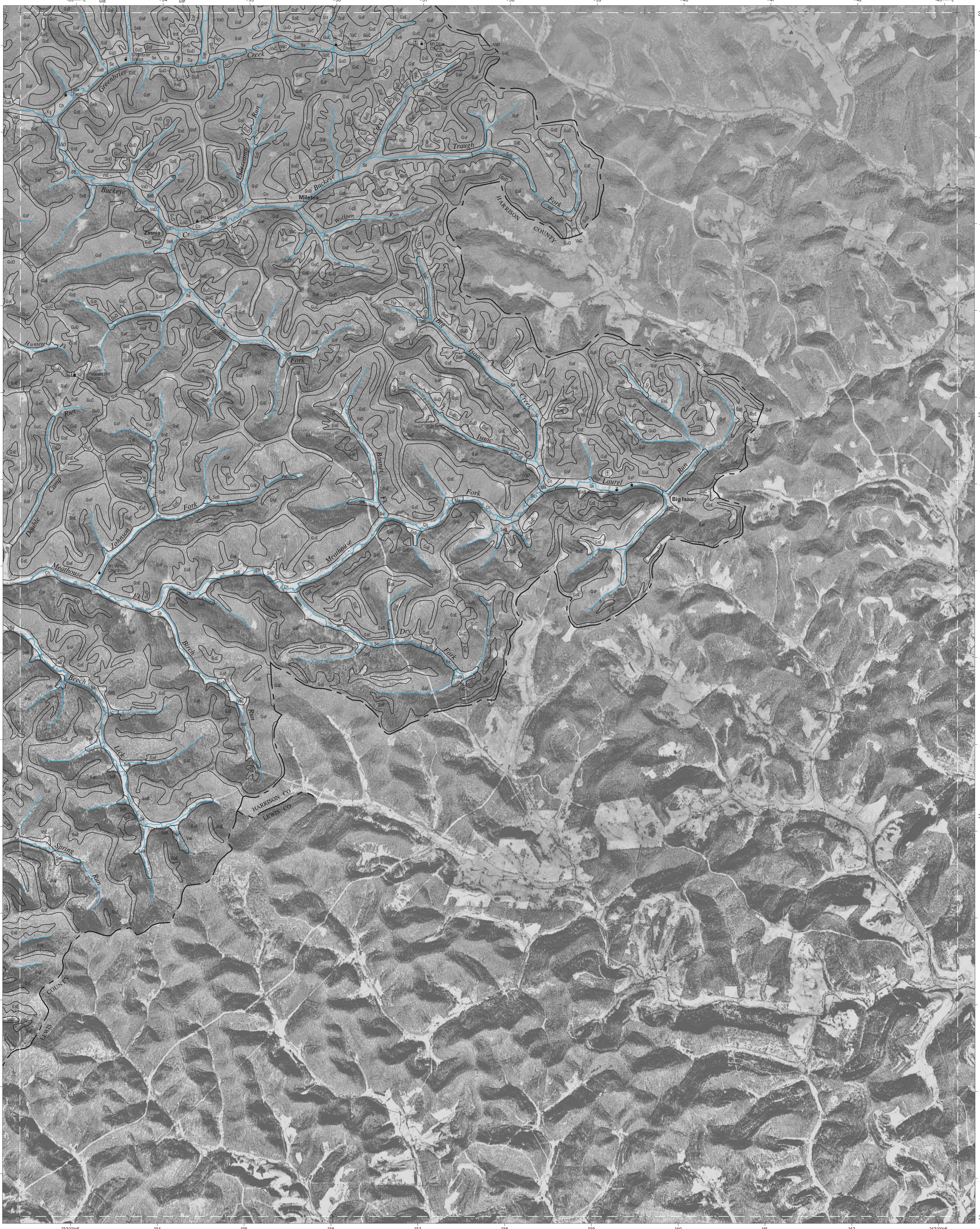
Joins sheet 7, Salem

Joins sheet 10, New Milton

Joins sheet 13, Vadis

80° 37′30″ · 80° 35′00″ · 80° 32′30″ · 80° 30′00″

39° 15′00″ · 39° 12′30″ · 39° 10′00″ · 39° 07′30″



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 17. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

6	7		
10			
13			

6 SMITHBURG
7 SALEM
10 NEW MILTON
13 VADIS

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BIG ISAAC, WEST VIRGINIA

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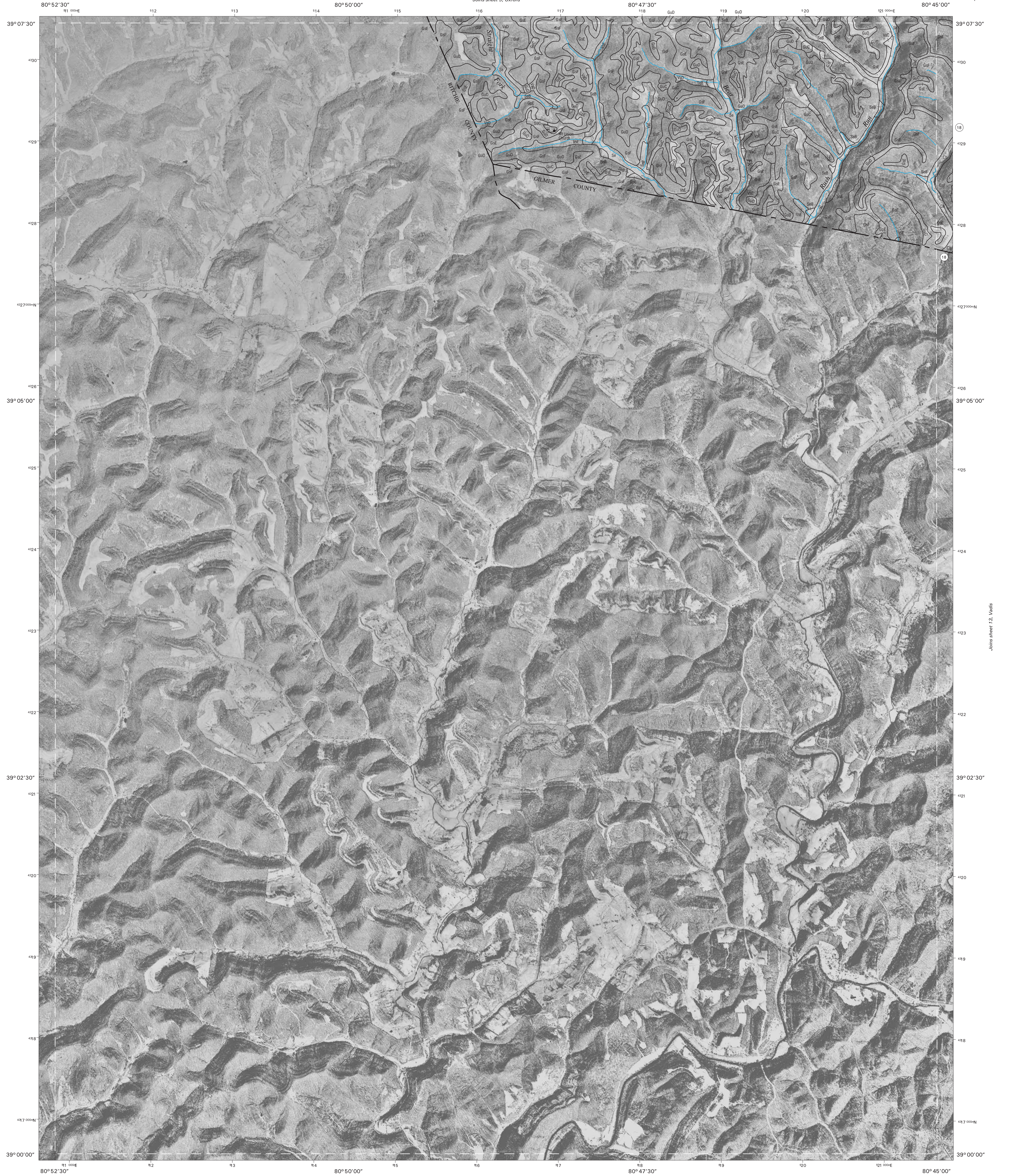
NATURAL RESOURCES CONSERVATION SERVICE

DODDRIDGE COUNTY, WEST VIRGINIA
AUBURN QUADRANGLE
SHEET NUMBER 12 OF 13



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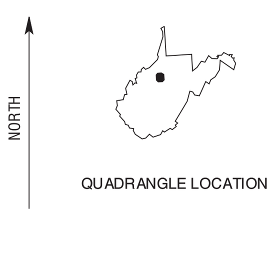

QUADRANGLE LOCATION

SCALE 1:24000

MILES

FEET

KILOMETERS

8	9	10
		13

8 PULLMAN
9 OXFORD
10 NEW MILTON
13 VADIS

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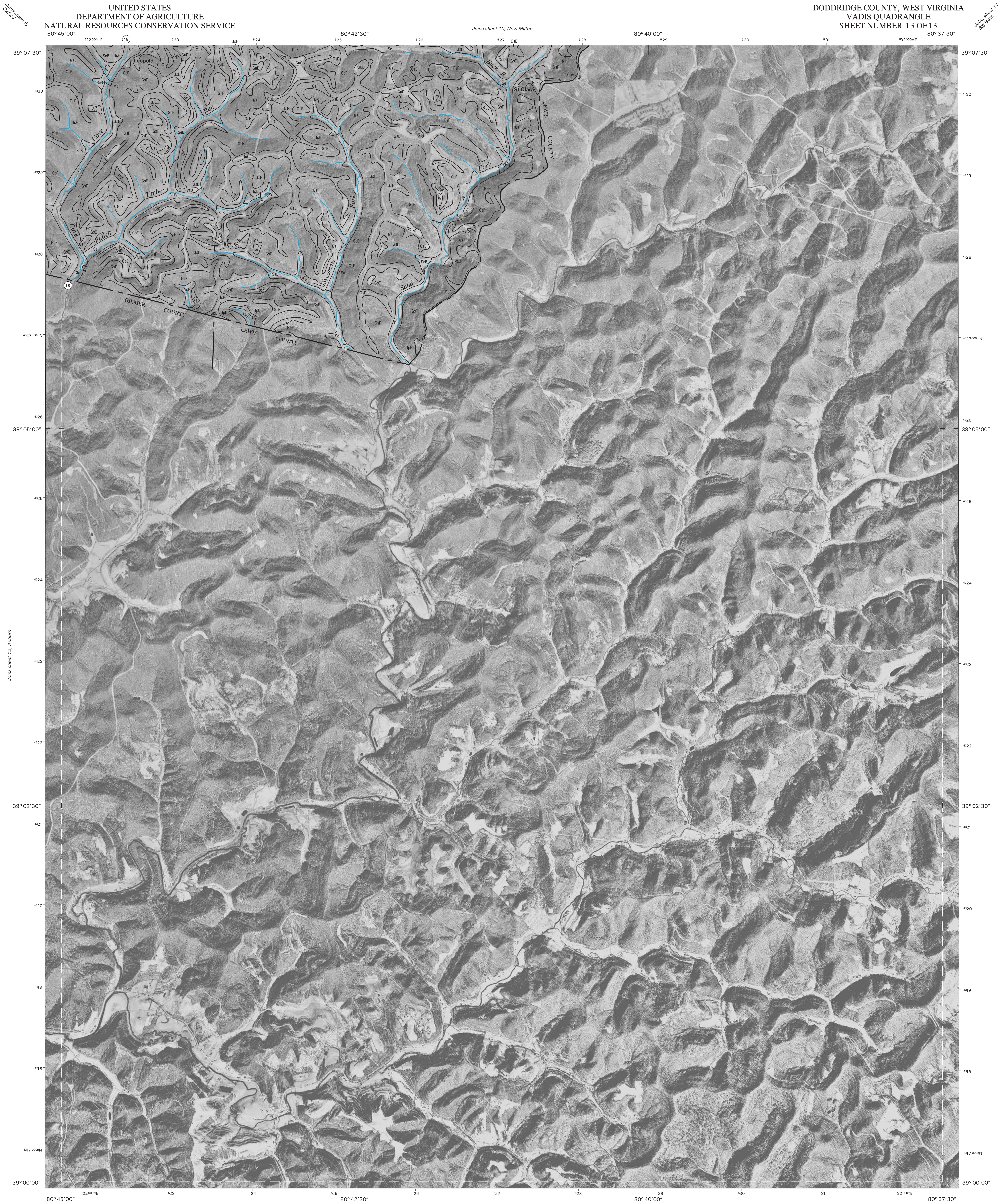
NATURAL RESOURCES CONSERVATION SERVICE

DODDRIDGE COUNTY, WEST VIRGINIA
VADIS QUADRANGLE
SHEET NUMBER 13 OF 13



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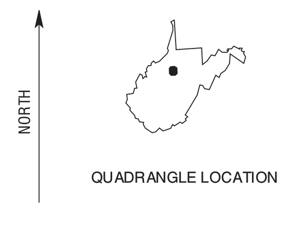

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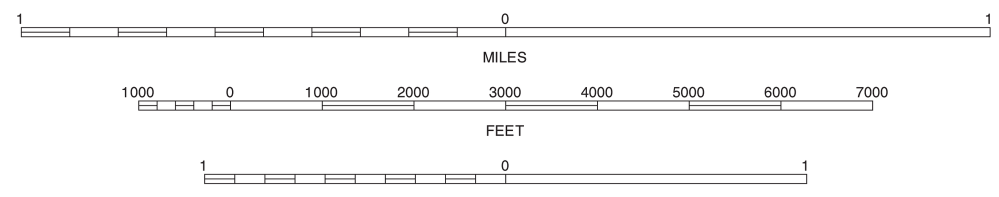

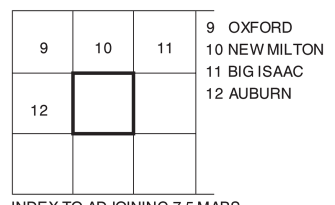

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